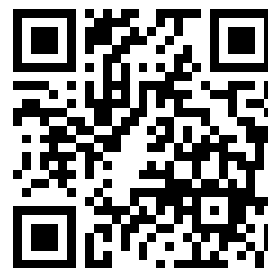


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# SOLDIER'S MANUAL

## HEAVY ANTIARMOR WEAPONS CREWMAN

### SKILL LEVELS 1 AND 2

### MOS 11H







**FIELD MANUAL**  
**No. 7-11H1/2**

**HEADQUARTERS**  
**DEPARTMENT OF THE ARMY**  
 Washington, DC, 16 November 1979

**SOLDIER'S MANUAL**  
**MOS 11H SKILL LEVEL 1/2**  
**HEAVY ANTIARMOR WEAPONS CREWMAN**

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### COMMANDER'S ATTENTION

Soldier's Manuals are designed to tell soldiers what tasks they must be proficient in to be MOS qualified. If soldiers follow the road map these manuals provide, they should progress readily to positions of responsibility commensurate with their aptitude and motivation.

Initial distribution of Soldier's Manuals will be made to the unit level, based upon assigned strength in the particular MOS and Skill Level. In the event additional manuals are needed by the unit for MOS study, libraries, or other training needs, requests for publications may be sent directly to the US Army Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220.


When soldiers are issued Soldier's Manuals by their units, they are responsible for retaining and maintaining them. If they transfer, they must return the manuals to their units.

Upon promotion to grades E5, E6, E7, or E8, the soldier may order his next higher level manual directly from the preparing agency.

To comply with guidance of the Assistant Secretary of Defense (Manpower and Reserve Affairs), this Soldier's Manual has been reviewed for the use of neuter language. Unless otherwise noted, the third person singular "he" stands for both masculine and feminine genders.

To assist you in your training of SM tasks, new or different material than that found in the same task in the 11B and 11C series SM has been identified by a star (★).

This Soldier's Manual was prepared by the US Army Infantry School.

  
 DAVID E. GRANGE, JR  
 Major General, USA  
 Commandant



## RESERVE COMPONENT COMMANDER

### ARMY NATIONAL GUARD

### ARMY RESERVE

The information on this page is for you, the Reserve/Guard component commander. Although this manual lists the critical tasks to be performed by the Active Army soldier in this MOS on equipment available in the Active Army inventory, most tasks in this manual are applicable to reservists/guardsmen without changes. However, some tasks may require modification because of differences of equipment, facilities, and training time available. Because of these differences, you, as a Reserve/Guard component commander, will need to be innovative and seek ways to enable your soldiers to accomplish their critical tasks.

This manual has been reviewed by an Army Readiness Region to add or delete Reserve Component (RC) peculiar tasks. It may not be completely applicable to all RC units. However, you must train your soldiers as completely as possible using all of the resources available to you, to include: ETV, simulators, TEC and other such training aids. Any major difficulties encountered in training your soldiers should be reported to the Infantry School.

Many tasks learned in basic combat training and advanced individual training are in this manual. There are other critical tasks that your reservists/guardsmen must learn on their own. Study materials have been prepared and can be ordered from the proponent agency. Your job is to make sure that the necessary study materials are available in your unit training center.

**CHAPTER 1**

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**SECTION I**  
**SKILL LEVEL ONE**  
**INTRODUCTION AND ROAD MAP**

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## WHAT IS A SOLDIER'S MANUAL?



### PERFORMANCE COUNTS

**IN COMBAT, PERFORMANCE COUNTS.** The job of an Infantryman (11H) in combat isn't easy. In fact, it's one of the hardest jobs you'll ever learn. You must have confidence, ability, and conditioning to be an Infantryman - a professional in the combat arms!

**DO YOU KNOW YOUR JOB?** Everyone likes to think he knows how to do his job. But those who think they know and those who really know are not always the same. First, you have to know what **TASKS** you are expected to do as an Infantryman (11H) in combat. Then you need to know the **CONDITIONS** under which you are going to do those tasks, and how well (**STANDARDS**) you must be able to do them, this manual tells you that. You can use it to find out if you really know your job.

**BEING A PROFESSIONAL.** The Soldier's Manual tells you those tasks you **must** be able to do to be a winner and stay alive in combat. They are called **COMBAT TASKS** - the most important part of an Infantryman's (11H) job. In combat, lives will depend on your ability to do them, so learn them well! You should already be able to do many of the tasks in this manual. Some were taught in basic or advanced individual training; others may have been recently taught in your unit training. It really doesn't matter when or where you first learned a task. The important thing is:

## CAN YOU DO IT NOW?





## HOW TO USE THE SOLDIER'S MANUAL

1. To understand how to use your Soldier's Manual, you must first know a few terms used in your Soldier's Manual. These terms are:

a. **Common Skill Level Task.** A task performed by every soldier in a specified skill level of a specified MOS.

b. **Critical Task.** A task needed to accomplish a mission or do a job and survive on the battlefield.

c. **Duty Position.** The same as job, a major subdivision of skill level. It is further divided into (or composed of) tasks. Thus, MOS 11H may be divided into four skill levels. The four skill levels may be further divided into 12 duty positions (jobs), each of which consists of many tasks.

d. **Duty Position Task.** A task identified with, and related to, a particular duty position (job) at a given skill level within a specified MOS.

e. **GO/NO GO.** This is a pass-fail measure whereby the soldier (student) cannot be partially correct. He either meets the standards or he does not meet the standard.

f. **Job.** The tasks performed by a soldier constitute his job. If identical tasks are performed by several soldiers, they all hold the same job. Job is the same as duty position. An MOS is composed of skill levels, and skill levels are composed of jobs, also called duty positions. Thus, an MOS 11H soldier is called a **Heavy Antiarmor Infantryman**, but his job may be **gunner** or **driver**.

g. **Military Occupational Specialty (MOS).** A term used to identify a grouping of duty positions having such close relationship that they are interchangeable among soldiers so classified at any skill level.

h. **Performance Measure.** Those steps or behavior that the soldier or scorer observes to determine if the task is being or has been performed correctly.

i. **Task.** An act or series of acts by a soldier to produce or achieve a certain result. It is the lowest level of behavior in a job that describes the performance of a meaningful function of a job. A task has an intermediate action that can be specifically stated in terms of behaviorable activities. Tasks vary in complexity. What appears to be a very simple task may be treated more meaningfully as part of a larger task. Conversely, what appears to be a complex task may be meaningfully broken into two or more component tasks. A group of tasks go together to form a job or duty position.

## HOW TO USE THE SOLDIER'S MANUAL

j. **Qualification Training.** Introductory training, usually entry level training, given an untrained soldier that results in the soldier performing a specified task to Soldier's Manual standards.

k. **Additional Training.** Refresher or advanced training given to a previously trained soldier that results in the soldier regaining or improving Soldier's Manual task standard proficiency.

l. **Color Coding.** The covers on all manuals are color coded. Skill Level 1/2 is yellow, Skill Level 3/4 is salmon, and Skill Level 5 is blue.

## COMMON SKILL LEVEL 1 TASKS

2. The Soldier's Manual for Skill Level 1 soldiers (grades E1-E4) contains common combat tasks that all 11H10 Heavy Antiarmor Weapons crewmen must be able to perform. These tasks are listed on the Road Map for Skill Level 1 in chapter 1, under "COMMON TASKS FOR ALL SKILL LEVEL 1 HEAVY ANTIARMOR INFANTRYMEN." The Road Map will tell you the page on which each task can be found.

## DUTY POSITION TASKS

3. Your duty position may require you to be able to do some add-on tasks. The table below lists the duty positions which require add-on tasks and the number of add-on tasks required. A list of tasks for each duty position and the page on which each task can be found is listed on the Road Map for Skill Level 1 in chapter 1 under DUTY POSITION TASKS.

DUTY POSITION	NUMBER OF TASKS
TOW Crewman _____	2
ITV Crewman _____ (omitted)	TBD
Wheeled-Vehicle Driver _____	7
Tracked-Vehicle Driver _____	9

## TASK SUMMARY

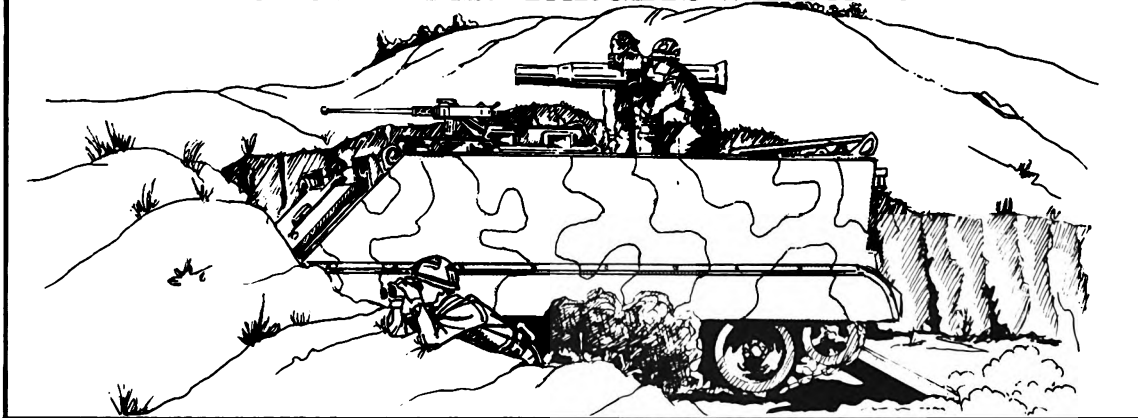
4. For each task in this manual, there is a **task summary** which has two parts— a **training objective**, and **training guidance**.

a. **Training Objective.** The training objective is written in three parts — **TASKS**, **CONDITIONS**, and **STANDARDS**.

(1) The **TASK** states what you must be able to do.

## TASK

**ENGAGE ENEMY TARGETS WITH A TOW.**



(2) The **CONDITIONS** state the **situation** in which you must be able to do it. All the **TASKS** in the Soldier's Manual are to be performed in combat uniform, wearing your load-bearing equipment and protective mask, and carrying your assigned weapon, unless the conditions note otherwise.

## CONDITIONS

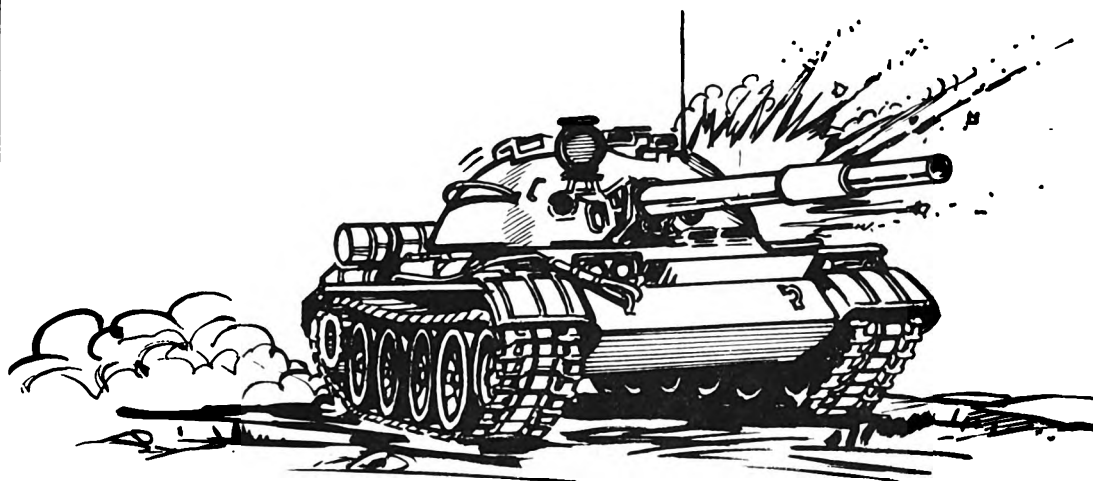
**FROM THIS FIGHTING POSITION**



(3) The **STANDARD** states how well you must be able to do it.

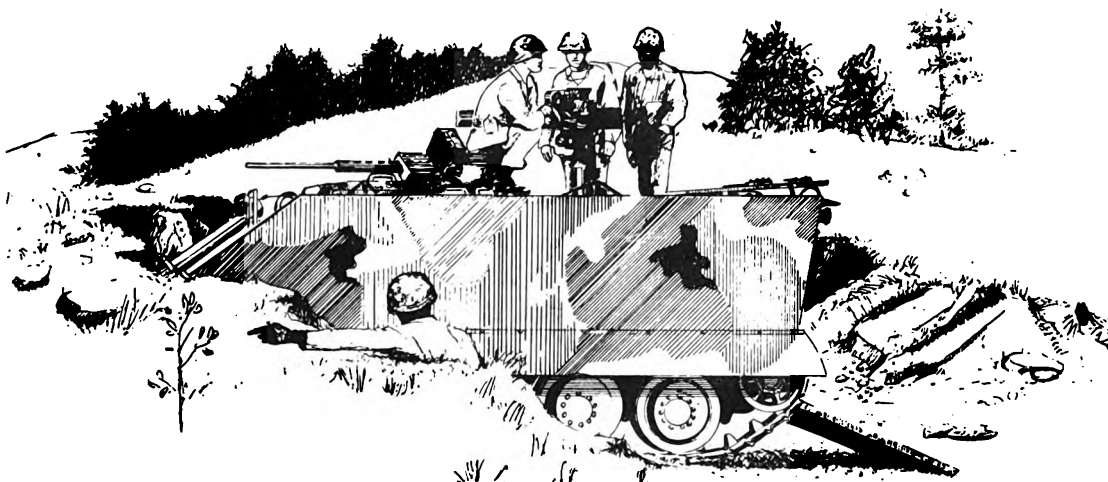
## STANDARDS

**DON'T LET ANY TANK COME UP THAT TRAIL.**



b. **Training Guidance.** Training guidance may have three parts: a step-by-step explanation (performance measures), training tips, and or/training references.

(1) The **performance measures** provide a good (not always the only) method of performing the task.



(2) The **training tips** provide guidance on how to train to perform the task.

(3) The **training references** direct you to the publications or training extension course (TEC) lessons which cover the subject in detail. These references may be updated from time to time. Your supervisor will provide you with the latest changes so you can keep your manual up to date.



## EPMS

1. Enlisted personnel have a complete career development system called the **Enlisted Personnel Management System (EPMS)**. It will affect the training, evaluation, classification, assignment and promotion of every enlisted soldier in the Army. The system is designed to provide career incentive, progression, and professionalism, while at the same time providing the right number of qualified people to carry out the Army's missions. There are five skill levels that correspond to a soldier's progression in grade. A Soldier's Manual has been developed for each of the skill levels identified below that contains those critical combat tasks that the soldier must be able to perform:

<u>Grade</u>	<u>Skill Level</u>	
E-1,2,3,4 & 5	Skill Level 1	} combined SM
E-6	Skill Level 2	
E-7	Skill Level 3	} combined SM
E-8 & 9	Skill Level 4	
	Skill Level 5	

2. Under EPMS, a soldier will be evaluated, then classified, and finally promoted to the next higher grade. This is a significant change from the past when a soldier was first promoted, then classified into a higher skill level, and then evaluated. The Army, in adopting EPMS, assures soldiers better opportunity for attaining and maintaining proficiency through improved training programs -- plus providing usable products-- Soldier's Manuals, Commanders's Manuals and Job Books -- to be used to train and evaluate soldier job performance.

## CAREER PROGRESSION UNDER EPMS

### HOW TO MAKE SERGEANT E5

*The Army will only promote men who have proved that they can do the job. In other words, you must show that you can do the tasks required of a sergeant before you can be considered for promotion to that grade. Here's how the system works:*



1. **LEARN THE TASKS IN THIS MANUAL** that apply to you. As soon as you have done that, **BEGIN LEARNING THE COMMON TASKS FOR SKILL LEVEL 2** in the manual. There will not be as many as you might think since many of the skills that you learned for Skill Level 1 will also be in the Skill Level 2 manual. Use the Skill Level 2 Road Map to determine which common tasks you need to learn.

2. A Skill Qualification Test (SQT) has been developed to replace each MOS test.

a. The goal of each SQT is to provide an equitable, reliable, and relevant means of determining the job proficiency of enlisted soldiers. It covers both the present and the next higher skill levels of the soldiers and is numbered to show the next higher skill level. For example, soldiers holding skill level (SL) 1 take SQT 2, which includes critical tasks from SL1 as well as critical tasks from SL2. Under the old 'MOS Test' the soldier was likely to be tested on the entire MOS. In the SQT, the soldier is tested only on critical tasks listed in the Soldier's Manual. The SQT sets Army-wide standards for all soldiers in MOS 11H.

b. The basic feature of the SQT is that it is task-oriented. The SQT is based on a thorough job and task analysis which identifies and rigorously defines the critical tasks of an MOS. The SQT samples this domain of critical tasks. All questions and problems in the SQT must bear directly on an individual's ability to perform the specified tasks. For example, an item on the SQT could require soldiers to show that they know how to achieve a correct sight picture for a weapon because that knowledge is required to fire the weapon effectively. **Knowledge of chamber pressure or muzzle velocity is not essential in firing the weapon effectively and will not be tested on the SQT.**

3. As an E4, you will **TAKE AN SQT**. The SQT will test your ability to do the tasks in the Soldier's Manual. You must make 80% or above on the SQT to qualify for promotion. Since the SQT will use the same conditions and standards used in the Soldier's Manual, you will be able to prepare in advance for the SQT.

4. The SQT has three parts: skill component, hands-on, and performance certification. Sixty to ninety days before the SQT is given, an SQT notice will be sent to each unit. It will tell which tasks will be tested in each part of the SQT. It will also tell how the task will be tested. There are three different ways to test a task. First, you may be asked to answer a **written question** (skill component) about how a task is performed. You will pick the correct answer from a list of answers and mark the correct answer on an answer sheet. Second, you may be asked to actually do the task. For example, you may be given an M72A2 LAW and be asked to prepare it for firing. This is called a **hands-on test** which means you are actually required to do the task as you would on the job. Third, your unit commander may observe your performance of a task and report your ability to perform it as part of your SQT score. Your performance, score, on all three parts of a test will be reported to you sometime soon after you complete the SQT. You will be told on which tasks you did not perform well. You can use your Soldier's Manual to improve your performance in those areas.

5. Also while you are an E4, you will **ATTEND THE PRIMARY NONCOMMISSIONED OFFICER'S COURSE (PNCOC)**. In this course, you will build on the skills you developed during unit training and gain leadership experience to help you perform better.

6. In addition to the SQT, you will **RECEIVE AN ENLISTED EFFICIENCY REPORT (EER)**. In the EER, your supervisor will give his opinion of your performance on the job. Both the SQT and the EER will be used to determine your final evaluation score.

7. If you don't understand any parts of the manual or want to know more about advancement opportunities, see your squad leader. Take advantage of his knowledge and experience.



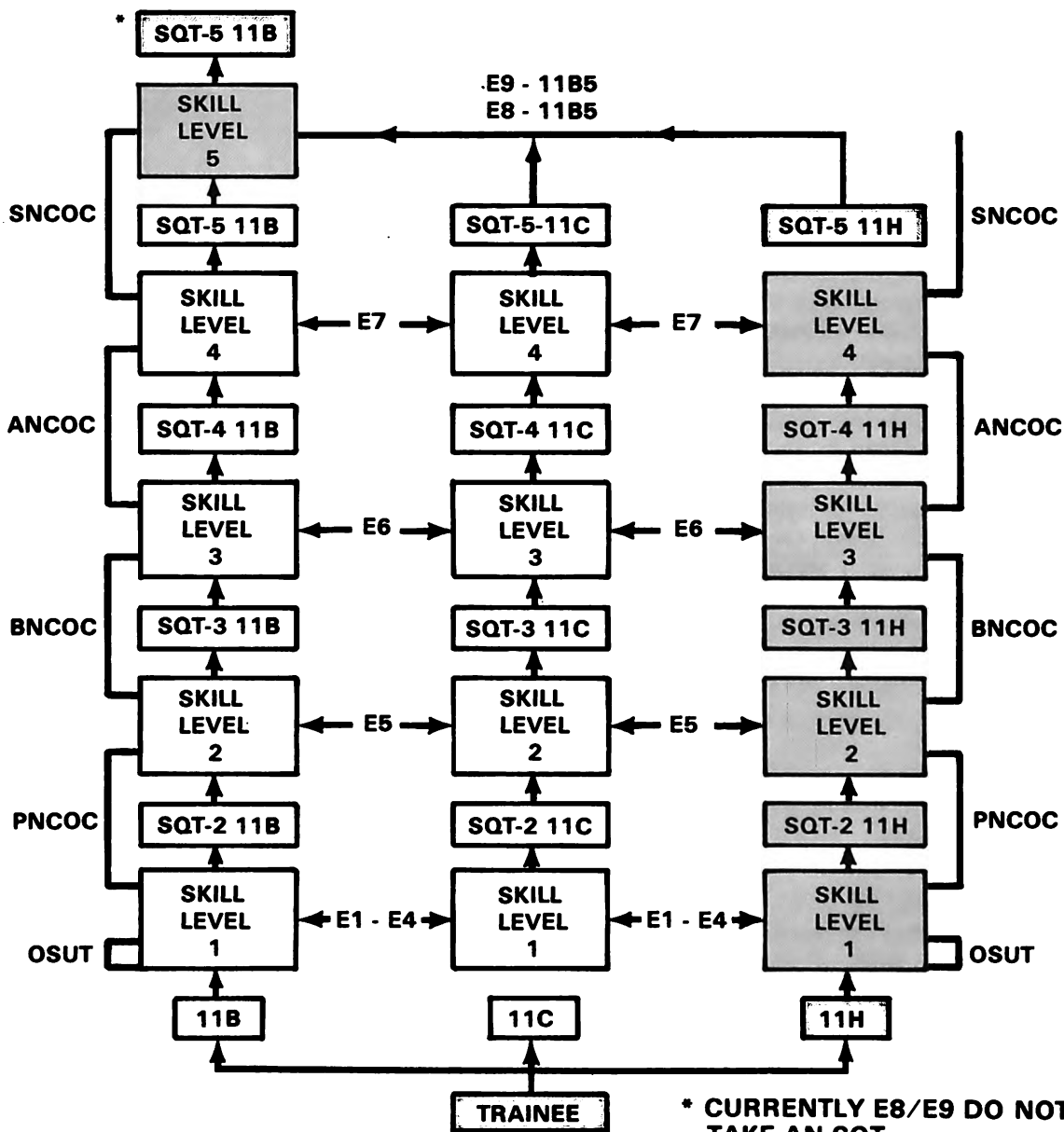
8. At the top of your enlisted chain of command is your sergeant major. He is an expert in helping young soldiers learn about training, evaluation, and the system for getting ahead in the Army. As such, he is responsible for insuring that your NCOs either provide the assistance you need or refer you to him for his guidance.

9. The Army wants and needs well-trained soldiers who desire to advance through the ranks. This manual and the willing assistance of senior NCOs are the tools you can use to your advantage and the Army's.

### **— A NOTE TO TRAINERS —**

Skills not practiced are soon lost. Football teams have pre-season practice each year to retrain players who have lost their skills during the off-season. A football coach plans and conducts practice depending on how well his players can perform basic skills such as blocking, running, and tackling. The same method is used by unit trainers. Your unit training program should be based on how well your soldiers can perform the combat tasks contained in Soldier's Manuals. After you determine the proficiency level of your soldiers, train them first in the skills they perform poorly. As a leader and trainer you must be able to perform all tasks required of soldiers in skill levels lower than your own. Using your knowledge and the process described in chapter 3 of FM 21-6, **How to Prepare and Conduct Military Training**, you have to get your team trained to win in combat. Every other year, the soldiers in your unit will be required to take an SQT to evaluate their ability to perform in combat. The evaluation score that the soldier receives on the test will in part determine his eligibility for promotion, reenlistment, schools, and future assignments. Indirectly, this test also measures your success as a trainer in preparing your soldiers for combat.

## THE INFANTRYMAN'S CAREER PROGRESSION UNDER EPMS



# ROAD MAP FOR HEAVY ANTIARMOR INFANTRYMAN SKILL LEVEL 1

## COMMON TASKS FOR ALL SKILL LEVEL 1 HEAVY ANTIARMOR INFANTRYMEN

### BATTLEFIELD SURVIVAL

<u>TASK NUMBER</u>	<u>FIRST AID</u>	<u>PAGE</u>
	Introduction to first aid.	2-1-A-1.1
081-831-1004	Perform mouth-to-mouth resuscitation and external heart massage.	2-1-A-2.1
081-831-1005	Stop bleeding (arm or leg).	2-1-A-3.1
081-831-1006	Identify signs of and treat for shock.	2-1-A-4.1
081-831-1007	Splint a fracture.	2-1-A-5.1
081-831-1008	Apply first aid measures for burns.	2-1-A-6.1
081-831-1010	Apply first aid for sun or heat injuries.	2-1-A-7.1
081-831-1011	Apply first aid for wet or cold injuries.	2-1-A-8.1

### NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC)

092-503-1001	Perform operator's maintenance on an M17 series protective mask.	2-I-B-1.1
092-503-1010	Exchange filters on an M17 series protective mask.	2-I-B-2.1
092-503-1002	Put on and wear a protective mask.	2-I-B-3.1
092-503-1015	Put on and wear protective clothing.	2-I-B-4.1
092-503-1007	Decontaminate self.	2-I-B-5.1
092-503-1008	Decontaminate individual equipment.	2-I-B-6.1

**COMMON TASKS - (NBC CONTINUED)**

<b><u>TASK NUMBER</u></b>		<b><u>PAGE</u></b>
092-503-1014	Identify a chemical agent using ABC-M8 detector paper.	2-I-B-7.1
092-503-1006	Give visual, vocal, and sound alarms for a chemical or biological attack.	2-I-B-8.1
092-503-1009	Satisfy personal needs in a chemical environment.	2-I-B-9.1
092-503-1005	Protect self against a nuclear hazard.	2-I-B-10.1
081-831-1012	Administer antidote to a nerve-agent casualty.	2-I-B-11.1
081-831-1017	Administer first aid to blood-agent casualty.	2-I-B-12.1
081-831-1015	Give back-pressure armlift artificial resuscitation to a chemical-agent casualty.	2-I-B-13.1
081-831-1014	Apply mask-to-mouth resuscitation to a chemical-agent casualty.	2-I-B-14.1
092-503-1004	Recognize and protect self against a chemical/biological (CB) hazard.	2-I-B-15.1

**INDIVIDUAL FITNESS**

071-327-0201	Maintain an appropriate level of physical fitness (male only).	2-I-C-1.1
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**COMBAT TECHNIQUES****BASIC INDIVIDUAL TECHNIQUES**

071-326-0502	Move under direct fire.	2-II-A-1.1
071-326-0510	React to indirect fire.	2-II-A-2.1
071-326-0511	React to flares.	2-II-A-3.1
071-326-0503	Move over, through, or around obstacles.	2-II-A-4.1
071-326-0512	Estimate range.	2-II-A-5.1
071-326-0513	Select temporary battlefield positions.	2-II-A-6.1
071-326-5703	Construct individual fighting position.	2-II-A-7.1
071-326-0600	Use visual signals to control movement (dismounted).	2-II-A-8.1

## CAMOUFLAGE, COVER, AND CONCEALMENT

<u>TASK NUMBER</u>		<u>PAGE</u>
051-202-1001	Camouflage/conceal self and individual equipment.	2-II-B-1.1
051-202-1002	Camouflage/conceal equipment.	2-II-B-2.1
051-202-1003	Camouflage/conceal defensive positions.	2-II-B-3.1

## SECURITY AND INTELLIGENCE

071-331-0801	Use challenge and password.	2-II-C-1.1
071-331-0802	Process known or suspected enemy personnel.	2-II-C-2.1
071-331-0803	Collect/report information - SALUTE.	2-II-C-3.1
071-331-0804	Conduct day and night surveillance without the aid of electronic devices.	2-II-C-4.1
071-331-0806	Identify opposing force (OPFOR) armored vehicles.	2-II-C-5.1
071-331-0808	Identify opposing force (OPFOR) weapons and equipment.	2-II-C-6.1

## COMMUNICATIONS

113-600-3001	Perform operator preventive maintenance on telephone set (TA-312/PT or TA-1/PT).	2-II-D-1.1
113-600-1001	Install telephone set (TA-312/PT or TA-1/PT).	2-II-D-2.1
113-587-3005	Perform operator maintenance on radio sets; AN/PRC-77 or AN/VRC-64.	2-II-D-3.1
113-587-2001	Operate radio set AN/PRC-77 or AN/PRC-25.	2-II-D-4.1
113-573-8001	Use an automated CEOI.	2-II-D-5.1
113-571-2001	Use KAL-61B 1400 numerical code to authenticate transmissions and encrypt/decrypt numbers and grid zone letters.	2-II-D-6.1
113-571-2002	Encode and decode messages using a KTC-600 tactical operations code.	2-II-D-7.1
113-571-1003	Establish and enter or leave a radio net.	2-II-D-8.1
113-571-1001	Transmit and receive a radio message.	2-II-D-9.1

LAND NAVIGATIONTASK NUMBERPAGE

	Introduction to land navigation.	2-II-E-1.1
071-329-1001	Identify terrain features (natural and man-made) on the map.	2-II-E-2.1
071-329-1002	Determine the grid coordinates of a point on a military map using the military grid reference system.	2-II-E-3.1
071-329-1010	Determine azimuths using a coordinate scale and protractor.	2-II-E-4.1
071-329-1009	Convert azimuths (magnetic or grid).	2-II-E-5.1
071-329-1003	Determine a magnetic azimuth using a compass.	2-II-E-6.1
071-329-1018	Determine direction using field expedient methods.	2-II-E-7.1

**WEAPONS**M16A1 RIFLE

	Introduction -- M16A1 Rifle.	2-III-A-1.1
071-311-2001	Perform operator maintenance on an M16A1 rifle, magazine, and ammunition.	2-III-A-2.1
071-311-2003	Load, reduce a stoppage, and clear an M16A1 rifle.	2-III-A-3.1
071-311-2004	Battlesight zero an M16A1 rifle.	2-III-A-4.1
071-311-2007	Qualify with the M16A1 rifle.	2-III-A-5.1
071-311-2006	Use limited visibility firing techniques with the M16A1 rifle.	2-III-A-6.1

LIGHT ANTITANK WEAPON (LAW)

071-318-2201	Prepare an M72A2 LAW for firing; restore M72A2 LAW to carrying configuration.	2-III-B-1.1
071-318-2202	Engage targets with an M72A2 LAW.	2-III-B-2.1
071-318-2203	Apply immediate action to correct a malfunction on an M72A2 LAW.	2-III-B-3.1

## HAND GRENADES AND MINES

### HAND GRENADES

<u>TASK NUMBER</u>		<u>PAGE</u>
071-325-4401	Perform safety checks on hand grenades.	2-IV-A-1.1
071-325-4402	Engage enemy targets with hand grenades.	2-IV-A-2.1
071-325-4405	Identify and employ hand grenades.	2-IV-A-3.1

### MINES

051-192-1502	Install and fire/recover an M18A1 claymore mine.	2-IV-B-1.1
051-192-1505	Install the M18A1 claymore with tripwires.	2-IV-B-2.1
051-192-1506	Disarm the M18A1 claymore (with tripwires)	2-IV-B-3.1
051-192-1008	Install the M21 metallic antitank (AT) mine.	2-IV-B-4.1
051-192-1018	Disarm the M21 metallic antitank mine.	2-IV-B-5.1
051-192-1002	Install the M16A1 bounding antipersonnel mine (with/without tripwires).	2-IV-B-6.1
051-192-1012	Disarm the M16A1 bounding antipersonnel mine equipped with and without tripwires.	2-IV-B-7.1
051-192-1021	Locate mines by visual means.	2-IV-B-8.1
051-192-1022	Locate mines by probing.	2-IV-B-9.1
051-192-1501	Neutralize enemy mines.	2-IV-B-10.1

## ANTIARMOR

### TOW

	Introduction to TOW.	2-V-A-1.1
071-316-2500	Assemble the TOW launcher.	2-V-A-2.1
071-316-2501	Perform operator maintenance on a TOW launcher.	2-V-A-3.1
071-316-2502	Conduct a system self-test and preoperational inspection of a TOW launcher and encased missile.	2-V-A-4.1



## (TOW CONTINUED)

<u>TASK NUMBER</u>		<u>PAGE</u>
071-316-2515	Install the TOW launcher and encased missile on its organic carrier (for extended travel).	2-V-A-5.1
071-316-2516	Determine TOW firing limitations.	2-V-A-6.1
071-316-2503	Load, arm, and unload an encased TOW missile.	2-V-A-7.1
071-316-2505	Determine if a target can be engaged by TOW.	2-V-A-8.1
071-316-2519	Engage a target with a TOW.	2-V-A-9.1
071-316-2504	Perform immediate action for a TOW mis-fire.	2-V-A-10.1
071-316-2521	Prepare an antiarmor range card (TOW).	2-V-A-11.1

END OF COMMON TASKS
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DUTY POSITION TASKS SKILL LEVEL 1
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GUNNER/ASSISTANT GUNNER
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191-376-0105	Maintain a caliber .45 pistol.	2-III-C-1.1
191-376-0104	Engage targets with a caliber .45 pistol.	2-III-C-2.1

WHEELED VEHICLE DRIVER
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071-333-6001	Drive a wheeled vehicle cross-country.	2-VI-A-1.1
071-333-6002	Drive a wheeled vehicle on roads, in vehicle parks, and in built-up areas.	2-VI-A-2.1
071-333-6003	Drive a wheeled vehicle using blackout drive.	2-VI-A-3.1

**( WHEELED VEHICLE DRIVER CONTINUED)**

<b><u>TASK NUMBER</u></b>		<b><u>PAGE</u></b>
<b>071-333-6004</b>	<b>Start a wheeled vehicle engine using auxiliary power (M151, M715, and M561).</b>	<b>2-VI-A-4.1</b>
<b>071-333-6007</b>	<b>Perform operator maintenance on a wheeled vehicle.</b>	<b>2-VI-A-5.1</b>
<b>071-333-6008</b>	<b>Recover a wheeled vehicle.</b>	<b>2-VI-A-6.1</b>

**TRACKED VEHICLE DRIVER (MECHANIZED UNITS ONLY)**

<b>071-333-6508</b>	<b>Perform operator maintenance on a tracked vehicle.</b>	<b>2-VI-B-1.1</b>
<b>071-333-6502</b>	<b>Drive a tracked vehicle on roads, in vehicle parks, and in built-up areas.</b>	<b>2-VI-B-2.1</b>
<b>071-333-6500</b>	<b>Drive a tracked vehicle (M113A1 or M901).</b>	<b>2-VI-B-3.1</b>
<b>071-333-6512</b>	<b>Negotiate obstacles in a tracked vehicle (M113A1 or M901).</b>	<b>2-VI-B-4.1</b>
<b>071-333-6505</b>	<b>Start a tracked vehicle engine using auxiliary power.</b>	<b>2-VI-B-5.1</b>
<b>071-333-6503</b>	<b>Drive a tracked vehicle with night vision devices, infrared equipment, and blackout drive.</b>	<b>2-VI-B-6.1</b>
<b>071-333-6504</b>	<b>Operate a tracked vehicle in water.</b>	<b>2-VI-B-7.1</b>
<b>071-333-6509</b>	<b>Recover a tracked vehicle using field expedients.</b>	<b>2-VI-B-8.1</b>
<b>113-587-2002</b>	<b>Prepare radio set AN/VRC-64 for operation.</b>	<b>2-II-D-10.1</b>



**CHAPTER 1**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION II**  
**SKILL LEVEL TWO**  
**INTRODUCTION AND ROAD MAP**

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## HOW TO USE THE SOLDIER'S MANUAL FOR SKILL LEVEL 2

Refer to the introduction to Skill Level 1, pages 1-I-A-1 thru 1-I-A-5, for an explanation of what is a Soldier's Manual. Refer to pages 1-I-A-7 thru 1-I-A-9 for an explanation of a task summary.

### COMMON SKILL LEVEL 2 TASKS

The Soldier's Manual for Skill Level 2 soldiers (grade E5) contains basic combat tasks that all 11H20 Infantrymen must be able to perform. These tasks are listed on the Road Map for Skill Level 2 in chapter 1, under "COMMON SKILL LEVEL 2 TASKS." The Road Map will tell you the page on which each task can be found.

### DUTY POSITION TASKS

Your duty position may require you to be able to do some add-on tasks. The table below lists the duty positions which require add-on tasks and the number of add-on tasks required. A list of tasks for each duty position and the page on which each task can be found are listed on the Road Map for Skill Level 2 under "DUTY POSITION TASKS."

	NUMBER OF TASKS
TOW Squad Leader	10
ITV Squad Leader (omitted)	TBP

## HOW TO MAKE SERGEANT E6

*The Army will only promote men who have proved that they can do the job. In other words, you must show that you can do the tasks required of a staff sergeant before you can be considered for promotion to that grade. Here is how the system works:*



1. **LEARN THE TASKS IN THIS MANUAL** that apply to you. As soon as you have done that, ask for a copy of the 11H30 Soldier's Manual (for Skill Level 3).

2. Then **LEARN THE COMMON TASKS IN THE SKILL LEVEL 3 MANUAL**. There will not be as many as you might think since many of the skills that you learned for Skill Level 2 will also be in the Skill Level 3 manual.

3. As an E5, you will **TAKE A SKILL QUALIFICATION TEST (SQT)**. The SQT will test your ability to do the tasks in the Soldier's Manual. You must make 80% or above on the SQT to qualify for promotion. Since the SQT will use the same conditions and standards used in the Soldier's Manual, you will be able to prepare in advance for the SQT.



4. The SQT has three parts: written, hands-on, and performance certification. Sixty to ninety days before the SQT is given, an SQT notice will be sent to each unit. It will tell which tasks will be tested in each part of the SQT. It will also tell how the task will be tested. There are three different ways to test a task. First, you may be asked to answer a **written question** about how a task is performed. You will pick the correct answer from a list of answers and mark the correct answer on a machine-scoreable answer sheet. Second, you may be asked to actually do the task. For example, you may be given an M72A2 LAW and be asked to prepare it for firing. This is called a **hands-on test** which means you are actually required to do the task as you would on the job. Third, your unit commander may observe your performance of a task and report your ability to perform it as part of your SQT score. Your performance on all three parts of the test will be reported to you sometime after you complete the SQT. You will be told which tasks you did not perform well. You can use your Soldier's Manual to improve your performance in those areas.

5. Also while you are an E5, you will ATTEND THE BASIC NONCOMMISSIONED OFFICER'S COURSE (BNCOC). In this course, you will build on the skills you developed during unit training and gain leadership experience to help you perform more effectively.

6. In addition to the SQT, you will RECEIVE AN ENLISTED EFFICIENCY REPORT (EER). In the EER, your supervisor will give his opinion of your performance on the job. Both the SQT and the EER will be used to determine your final evaluation score.

7. If you don't understand any parts of the manual or want to know more about advancement opportunities, see your squad leader. Take advantage of his knowledge and experience.

8. At the top of your enlisted chain of command is your sergeant major. He is an expert in helping younger soldiers learn about training, evaluation, and the system for getting ahead in the Army. As such, he is responsible for insuring that your NCOs either provide the assistance you need or refer you to him for his guidance and help.

9. The Army wants and need well-trained soldiers who desire to advance through the ranks. This manual and the willing assistance of senior NCOs are the tools you can use to your advantage and the Army's.



# ROAD MAP FOR HEAVY ANTIARMOR INFANTRYMAN SKILL LEVEL 2

## COMMON TASKS FOR ALL SKILL LEVEL 2 HEAVY ANTIARMOR INFANTRYMEN

**NOTE:**

1. TASKS MARKED (SL1) WERE SKILL LEVEL 1 SOLDIERS' TASKS AND ARE NOW YOUR RESPONSIBILITY.

2.   TASKS MARKED IN THIS MANNER ARE YOUR NEW SKILL LEVEL 2 TASKS.

### BATTLEFIELD SURVIVAL

<u>TASK NUMBER</u>	<u>FIRST AID</u>	<u>SL</u>	<u>PAGE</u>
	Introduction to first aid.	1	2-1-A-1.1
081-831-1004	Perform mouth-to-mouth resuscitation and external heart massage.	1	2-1-A-2.1
081-831-1005	Stop bleeding (arm or leg).	1	2-1-A-3.1
081-831-1006	Identify signs of and treat for shock.	1	2-1-A-4.1
081-831-1007	Splint a fracture.	1	2-1-A-5.1
081-831-1008	Apply first aid measures for burns.	1	2-1-A-6.1
081-831-1010	Apply first aid for sun or heat injuries.	1	2-1-A-7.1
081-831-1011	Apply first aid for wet or cold injuries.	1	2-1-A-8.1

### NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC)

092-503-1001	Perform operator's maintenance on an M17 series protective mask.	1	2-I-B-1.1
092-503-1010	Exchange filters on an M17 series protective mask.	1	2-I-B-2.1
092-503-1002	Put on and wear a protective mask.	1	2-I-B-3.1
092-503-1015	Put on and wear protective clothing.	1	2-I-B-4.1

1-II-B-1

**COMMON TASKS - (NBC CONTINUED)**

<b><u>TASK NUMBER</u></b>		<b><u>SL</u></b>	<b><u>PAGE</u></b>
092-503-1007	Decontaminate self.	1	2-I-B-5.1
092-503-1008	Decontaminate individual equipment.	1	2-I-B-6.1
092-503-1014	Identify a chemical agent using ABC-M8 detector paper.	1	2-I-B-7.1
092-503-1006	Give visual, vocal, and sound alarms for a chemical or biological attack.	1	2-I-B-8.1
092-503-1009	Satisfy personal needs in a chemical environment.	1	2-I-B-9.1
092-503-1005	Protect self against a nuclear hazard.	1	2-I-B-10.1
081-831-1012	Administer antidote to a nerve-agent casualty.	1	2-I-B-11.1
081-831-1017	Administer first aid to blood-agent casualty.	1	2-I-B-12.1
081-831-1015	Give back-pressure armlift artificial resuscitation to a chemical-agent casualty.	1	2-I-B-13.1
081-831-1014	Apply mask-to-mouth resuscitation to a chemical-agent casualty.	1	2-I-B-14.1
092-503-1004	Recognize and protect self against a chemical/biological (CB) hazard.	1	2-I-B-15.1
092-503-2002	Decontaminate equipment using ABC-M11 decontamination apparatus.	2	2-I-B-16.1
092-503-2007	Ignite smoke pots.	2	2-I-B-17.1
092-503-2001	Read and report radiation dosages.	2	2-I-B-18.1

**INDIVIDUAL FITNESS**

071-327-0201	Maintain an appropriate level of physical fitness (male only).	1	2-I-C-1.1
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# COMBAT TECHNIQUES

## BASIC INDIVIDUAL TECHNIQUES

<u>TASK NUMBER</u>		<u>SL</u>	<u>PAGE</u>
071-326-0502	Move under direct fire.	1	2-II-A-1.1
071-326-0510	React to indirect fire.	1	2-II-A-2.1
071-326-0511	React to flares.	1	2-II-A-3.1
071-326-0503	Move over, through, or around obstacles.	1	2-II-A-4.1
071-326-0512	Estimate range.	1	2-II-A-5.1
071-326-0513	Select temporary battlefield positions.	1	2-II-A-6.1
071-326-5703	Construct individual fighting position.	1	2-II-A-7.1
071-326-0600	Use visual signals to control movement (dismounted).	1	2-II-A-8.1
071-329-1021	Determine an enemy target location using grid coordinates.	2	2-II-A-9.1
061-283-6002	Locate a target by shift from a known point.	2	2-II-A-10.1
061-283-6003	Call for/adjust indirect fire.	2	2-II-A-11.1
071-326-5704	Supervise/evaluate construction of a fighting position.	2	2-II-A-12.1

## CAMOUFLAGE, COVER, AND CONCEALMENT

051-202-1001	Camouflage/conceal self and individual equipment.	1	2-II-B-1.1
051-202-1002	Camouflage/conceal equipment.	1	2-II-B-2.1
051-202-1003	Camouflage/conceal defensive positions.	1	2-II-B-3.1

## SECURITY AND INTELLIGENCE

071-331-0801	Use challenge and password.	1	2-II-C-1.1
071-331-0802	Process known or suspected enemy personnel.	1	2-II-C-2.1
071-331-0803	Collect/report information - SALUTE.	1	2-II-C-3.1

## COMMON TASKS - (SECURITY AND INTELLIGENCE CONTINUED)

<u>TASK NUMBER</u>		<u>SL</u>	<u>PAGE</u>
071-331-0804	Conduct day and night surveillance without the aid of electronic devices.	1	2-II-C-4.1
071-331-0806	Identify opposing force (OPFOR) armored vehicles.	1	2-II-C-5.1
071-331-0808	Identify opposing force (OPFOR) weapons and equipment.	1	2-II-C-6.1
071-331-0807	Enforce noise, light, and litter discipline.	2	2-II-C-7.1
071-331-0809	Emplace and recover field expedient warning devices.	2	2-II-C-8.1
071-331-0810	Emplace/recover pyrotechnic early warning devices.	2	2-II-C-9.1
071-331-0811	Emplace/recover electronic anti-intrusion devices.	2	2-II-C-10.1

COMMUNICATIONS

113-600-3001	Perform operator preventive maintenance on telephone set (TA-312/PT or TA-1/PT).	1	2-II-D-1.1
113-600-1001	Install telephone set (TA-312/PT or TA-1/PT).	1	2-II-D-2.1
113-587-3005	Perform operator maintenance on radio sets; AN/PRC-77 or AN/VRC-64.	1	2-II-D-3.1
113-587-2001	Operate radio set AN/PRC-77 or AN/PRC-25.	1	2-II-D-4.1
113-573-8001	Use an automated CEOI.	1	2-II-D-5.1
113-571-2001	Use KAL-61B 1400 numerical code to authenticate transmissions and encrypt/decrypt numbers and grid zone letters.	1	2-II-D-6.1
113-571-2002	Encode and decode messages using a KTC-600 tactical operations code.	1	2-II-D-7.1
113-571-1003	Establish and enter or leave a radio net.	1	2-II-D-8.1
113-571-1001	Transmit and receive a radio message.	1	2-II-D-9.1

## LAND NAVIGATION

<u>TASK NUMBER</u>		<u>SL</u>	<u>PAGE</u>
	Introduction to land navigation.	1	2-II-E-1.1
071-329-1001	Identify terrain features (natural and man-made) on the map.	1	2-II-E-2.1
071-329-1002	Determine the grid coordinates of a point on a military map using the military grid reference system.	1	2-II-E-3.1
071-329-1010	Determine azimuths using a coordinate scale and protractor.	1	2-II-E-4.1
071-329-1009	Convert azimuths (magnetic or grid).	1	2-II-E-5.1
071-329-1003	Determine a magnetic azimuth using a compass.	1	2-II-E-6.1
071-329-1018	Determine direction using field expedient methods.	1	2-II-E-7.1
071-329-1006	Navigate from one position on the ground to another point.	2	2-II-E-8.1
071-329-1007	Determine distance while moving between 2 points on the ground.	2	2-II-E-9.1
071-329-1008	Measure distance on a map.	2	2-II-E-10.1
071-329-1004	Determine the elevation of a point on the ground using a map.	2	2-II-E-11.1
071-329-1011	Orient a map using a compass.	2	2-II-E-12.1
071-329-1005	Determine a location on the ground by terrain association.	2	2-II-E-13.1
071-329-1012	Orient a map to the ground by map-terrain association.	2	2-II-E-14.1
071-329-1014	Locate an unknown point on a map or on the ground by intersection.	2	2-II-E-15.1
071-329-1015	Locate an unknown point on a map or on the ground by resection.	2	2-II-E-16.1

<b>WEAPONS</b>
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**M16A1 RIFLE**

<b><u>TASK NUMBER</u></b>		<b><u>SL</u></b>	<b><u>PAGE</u></b>
	<b>Introduction -- M16A1 Rifle.</b>	<b>1</b>	<b>2-III-A-1.1</b>
<b>071-311-2001</b>	<b>Perform operator maintenance on an M16A1 rifle, magazine, and ammunition.</b>	<b>1</b>	<b>2-III-A-2.1</b>
<b>071-311-2003</b>	<b>Load, reduce a stoppage, and clear an M16A1 rifle.</b>	<b>1</b>	<b>2-III-A-3.1</b>
<b>071-311-2004</b>	<b>Battlesight zero an M16A1 rifle.</b>	<b>1</b>	<b>2-III-A-4.1</b>
<b>071-311-2007</b>	<b>Qualify with the M16A1 rifle.</b>	<b>1</b>	<b>2-III-A-5.1</b>
<b>071-311-2006</b>	<b>Use limited visibility firing techniques with the M16A1 rifle.</b>	<b>1</b>	<b>2-III-A-6.1</b>

**LIGHT ANTITANK WEAPON (LAW)**

<b>071-318-2201</b>	<b>Prepare an M72A2 LAW for firing; restore M72A2 LAW to carrying configuration.</b>	<b>1</b>	<b>2-III-B-1.1</b>
<b>071-318-2202</b>	<b>Engage targets with an M72A2 LAW.</b>	<b>1</b>	<b>2-III-B-2.1</b>
<b>071-318-2203</b>	<b>Apply immediate action to correct a malfunction on an M72A2 LAW.</b>	<b>1</b>	<b>2-III-B-3.1</b>

**CALIBER .45 PISTOL**

<b>191-376-0105</b>	<b>Maintains a caliber .45 pistol.</b>	<b>1</b>	<b>2-III-C-1.1</b>
<b>191-376-0104</b>	<b>Engage targets with a caliber .45 pistol.</b>	<b>1</b>	<b>2-III-C-2.1</b>

<b>HAND GRENADES, MINES, AND DEMOLITIONS</b>
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**HAND GRENADES**

<b>071-325-4401</b>	<b>Perform safety checks on hand grenades.</b>	<b>1</b>	<b>2-IV-A-1.1</b>
<b>071-325-4402</b>	<b>Engage enemy targets with hand grenades.</b>	<b>1</b>	<b>2-IV-A-2.1</b>
<b>071-325-4405</b>	<b>Identify and employ hand grenades.</b>	<b>1</b>	<b>2-IV-A-3.1</b>



**MINES**

<b><u>TASK NUMBER</u></b>		<b><u>SL</u></b>	<b><u>PAGE</u></b>
051-192-1502	Install and fire/recover an M18A1 claymore mine.	1	2-IV-B-1.1
051-192-1505	Install the M18A1 claymore with tripwires.	1	2-IV-B-2.1
051-192-1506	Disarm the M18A1 claymore (with tripwires)		2-IV-B-3.1
051-192-1008	Install the M21 metallic antitank (AT) mine.	1	2-IV-B-4.1
051-192-1018	Disarm the M21 metallic antitank mine.	1	2-IV-B-5.1
051-192-1002	Install the M16A1 bounding antipersonnel mine (with/without tripwires).	1	2-IV-B-6.1
051-192-1012	Disarm the M16A1 bounding antipersonnel mine equipped with and without tripwires.	1	2-IV-B-7.1
051-192-1021	Locate mines by visual means.	1	2-IV-B-8.1
051-192-1022	Locate mines by probing.	1	2-IV-B-9.1
051-192-1501	Neutralize enemy mines.	1	2-IV-B-10.1

**DEMOLITIONS**

051-193-1503	Construct a nonelectric (initiation) detonating assembly.	2	2-IV-C-1.1
051-193-1003	Prime a demolition block nonelectrically.	2	2-IV-C-2.1
051-193-1004	Construct an electric (initiation) detonating assembly.	2	2-IV-C-3.1
051-193-1005	Prime demolition block electrically.	2	2-IV-C-4.1
051-193-1006	Connect electrical firing circuits.	2	2-IV-C-5.1
051-193-1010	Install firing devices on standard military explosives.	2	2-IV-C-6.1
051-193-1501	Prepare and detonate explosives using detonating cord.	2	2-IV-C-7.1
051-193-1502	Clear demolition misfires (above ground).	2	2-IV-C-8.1

# ANTIARMOR

## TOW

<u>TASK NUMBER</u>		<u>SL</u>	<u>PAGE</u>
	Introduction to TOW.		2-V-A-1.1
071-316-2500	Assemble the TOW launcher.	1	2-V-A-2.1
071-316-2501	Perform operator maintenance on a TOW launcher.	1	2-V-A-3.1
071-316-2502	Conduct a system self-test and preoperational inspection of a TOW launcher and encased missile.	1	2-V-A-4.1
071-316-2515	Install the TOW launcher and encased missile on its organic carrier (for extended travel).	1	2-V-A-5.1
071-316-2516	Determine TOW firing limitations.	1	2-V-A-6.1
071-316-2503	Load, arm, and unload an encased TOW missile.	1	2-V-A-7.1
071-316-2505	Determine if a target can be engaged by TOW.	1	2-V-A-8.1
071-316-2519	Engage a target with a TOW.	1	2-V-A-9.1
071-316-2504	Perform immediate action for a TOW misfire.	1	2-V-A-10.1
071-316-2521	Prepare an antiarmor range card (TOW).	1	2-V-A-11.1
071-316-2602	Supervise combat loading of personnel and equipment in organic vehicle.	2	2-V-A-12.1
071-316-2603	Supervise construction and camouflage of a TOW fighting position.	2	2-V-A-13.1

# TACTICAL VEHICLES

## WHEELED VEHICLES

071-333-6001	Drive a wheeled vehicle cross-country.		2-VI-A-1.1
071-333-6002	Drive a wheeled vehicle on roads, in vehicle parks, and in built-up areas.	1	2-VI-A-2.1

**(WHEELED VEHICLES CONTINUED)**

<b><u>TASK NUMBER</u></b>		<b><u>SL</u></b>	<b><u>PAGE</u></b>
071-333-6003	Drive a wheeled vehicle using blackout drive.	1	2-VI-A-3.1
071-333-6004	Start a wheeled vehicle engine using auxiliary power (M151, M715, and M561).	1	2-VI-A-4.1
071-333-6007	Perform operator maintenance on a wheeled vehicle.	1	2-VI-A-5.1
071-333-6008	Recover a wheeled vehicle.	1	2-VI-A-6.1

**TRACKED VEHICLES (MECHANIZED UNITS ONLY)**

071-333-6508	Perform operator maintenance on a tracked vehicle.	1	2-VI-B-1.1
071-333-6502	Drive a tracked vehicle on roads, in vehicle parks, and in built-up areas.	1	2-VI-B-2.1
071-333-6500	Drive a tracked vehicle (M113A1 or M901).	1	2-VI-B-3.1
071-333-6512	Negotiate obstacles in a tracked vehicle (M113A1 or M901).	1	2-VI-B-4.1
071-333-6505	Start a tracked vehicle engine using auxiliary power.	1	2-VI-B-5.1
071-333-6503	Drive a tracked vehicle with night vision devices, infrared equipment, and blackout drive.	1	2-VI-B-6.1
071-333-6504	Operate a tracked vehicle in water.	1	2-VI-B-7.1
071-333-6509	Recover a tracked vehicle using field expedients.	1	2-VI-B-8.1

**LEADERSHIP AND TRAINING****LEADERSHIP**

071-328-5301	Inspect personnel/equipment.	2	2-VII-A-1.1
071-328-5302	Supervise maintenance on individual and TOE equipment.	2	2-VII-A-2.1
071-328-5304	Enforce preventive medicine program (includes personal hygiene).	2	2-VII-A-3.1
121-030-2501	Prepare the rater's section of an Enlisted Evaluation Report (EER).	2	2-VII-A-4.1

**TRAINING**

<b><u>TASK NUMBER</u></b>		<b><u>SL</u></b>	<b><u>PAGE</u></b>
874-896-2001	Conduct a performance-oriented training session.	2	2-VII-B-1.1
874-896-3001	Prepare and conduct a performance oriented training session (individual and collective).	2	2-VII-B-2.1

**TACTICS****BASIC TACTICS**

071-316-2550	Occupy a TOW firing position.	2	2-VIII-A-2.1
071-316-2552	Control TOW squad fires.	2	2-VIII-A-3.1
071-316-2555	React to direct fire while mounted (TOW/ITV).	2	2-VIII-A-6.1
071-326-0601	Use visual signals to control movement (mounted).	2	2-VIII-A-7.1

**END OF COMMON TASKS****DUTY POSITION TASKS  
SKILL LEVEL 2****TOW SQUAD LEADER (MECHANIZED UNITS)**

071-313-3451	Perform operator maintenance on a caliber .50 M2 HB machinegun and ammunition.	2	2-III-E-1.1
071-313-3452	Target/zero a caliber .50 machinegun.	2	2-III-E-2.1
071-313-3453	Load, reduce a stoppage, unload, and clear a caliber .50 machinegun.	2	2-III-E-3.1
071-313-3454	Engage targets with a caliber .50 machinegun.	2	2-III-E-4.1

## ( TOW SQUAD LEADER (MECHANIZED UNITS) CONTINUED )

<u>TASK NUMBERS</u>		<u>SL</u>	<u>PAGE</u>
071-313-3455	Set headspace and timing on a caliber .50 machinegun.	2	2-III-E-5.1
071-313-2314	Mount/dismount AN/TVS-2 sight on caliber .50 machinegun.	2	2-III-E-6.1
071-313-2315	Boresight AN/TVS-2 to caliber .50 machinegun.	2	2-III-E-7.1
113-587-2002	Prepare radio set AN/VRC-64 for operation.	1	2-II-D-10.1
071-326-3001	Select exact terrain route for a tracked vehicle and direct the driver over the route.	2	2-VIII-A-4.1
071-326-3002	React to indirect fire while mounted.	2	2-VIII-A-5.1



CHAPTER 2

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION I**  
**BATTLEFIELD SURVIVAL**

---

**TASK SUMMARIES**





## INTRODUCTION TO FIRST AID

Since a medic cannot be with every soldier, your life and the lives of other soldiers may depend upon how much you know about first aid.

First aid is the emergency or lifesaving care given to a sick, injured, or wounded person when a medically trained person is not immediately available. Without this emergency care, a sick, injured, or wounded person may not live until he can receive medical treatment. It is important that everyone know how to apply lifesaving first aid measures, especially the soldier on the training field or battlefield.

This material is designed to be a handy guide when an emergency arises. For this reason, it contains only essential information about real emergencies which you may face and should be able to handle. To learn how to apply all first aid measures, you should read FM 21-11.

### 1. Lifesaving Measures:

a. **Open airway and restore breathing and heartbeat.** Lack of oxygen intake (through breathing and heartbeat) leads to death in a very few minutes.

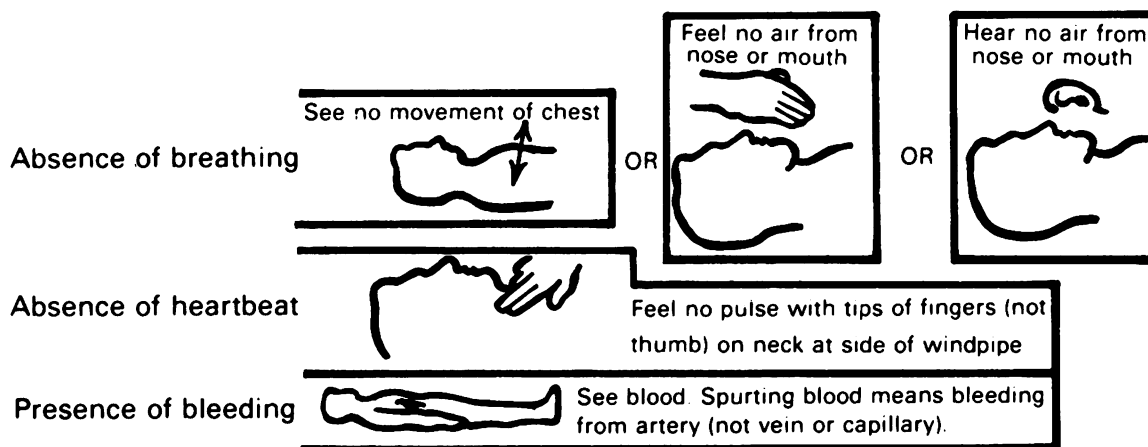
b. **Stop bleeding.** Life cannot continue without adequate volume of blood to carry oxygen to tissues.

c. **Prevent shock.** Unless shock is prevented or corrected, death may result even though injury would not otherwise be fatal.

d. **Dress and bandage wounds to avoid infection.** Healing of wound and recovery depend to great extent upon how well the wound was protected from contamination initially.

### 2. Basic Guides:

a. **Examine promptly and calmly for:**



**b. Apply lifesaving measures a and b instantly.**

If no sign of breathing ..... Open airway (a).  
 If still no sign of breathing ..... Start artificial respiration (a).\*  
 If no pulse or only very weak, irregular pulse ..... Start closed-chest  
 heart massage with  
 artificial respiration (a).\*  
 If bleeding ..... Apply pressure (b).

\*Continue until the person regains consciousness, until you are relieved by medically trained person, or for at least 45 minutes in the absence of all life signs.

**c. Re-examine immediately head-to-toe and front-to-back for:**

(1) Other injuries -- Fractures, injuries without associated wounds, etc.

(2) Signs of shock -- Early signs: Restlessness, thirst, pale skin, rapid heartbeat. May be excited or appear calm and very tired; may be sweating although skin is cool and clammy. Signs when shock becomes worse: Fast breaths or gasps; staring into space; blotchy or bluish skin, especially around mouth.

**d. Apply lifesaving measures c and d promptly.** Apply shock prevention and control measures (c). Dress and bandage wounds to avoid infection (d).

**e. Arrange evacuation to nearest medical treatment facility.**

**3. Do Nots:** (To act incorrectly can be just as serious or fatal to a wounded soldier as the failure to administer a lifesaving measure.)

**a. Do not let soldier remain on his back if he is unconscious or has face or neck wound.**

**b. Do not pull or tear clothing from injured soldier.**

**c. Do not touch or try to clean dirty wounds, including burns.**

**d. Do not remove dressings and bandages once they have been placed over wound.**

**e. Do not loosen tourniquet once it has been applied.**

**f. Do not move soldier with fracture until it has been properly splinted unless necessary to save his life.**

**g. Do not give fluids to soldier who is unconscious, nauseated, or vomiting or has abdominal or neck wound.**

**h. Do not permit head to be lower than body when soldier has head injury.**

**i. Do not try to push protruding intestines or brain tissue back into wound.**

- j. Do not put any medication on burns.**
- k. Do not try to give first aid measures which are unnecessary or beyond your capabilities.**
- l. Do not fail to resupply your first aid case with items used from it.**



**TASK NUMBER: 081-831-1004**

---

**PERFORM MOUTH-TO-MOUTH RESUSCITATION AND  
EXTERNAL HEART MASSAGE**

---

**CONDITIONS:**

Situation 1--Given an unconscious casualty who has stopped breathing but still has a heartbeat.

Situation 2--Given an unconscious casualty who has stopped breathing and has no heartbeat, and one soldier to assist.

**STANDARDS:**

Situation 1--Properly apply mouth-to-mouth resuscitation until the casualty resumes breathing or until relieved, IAW performance measures below.

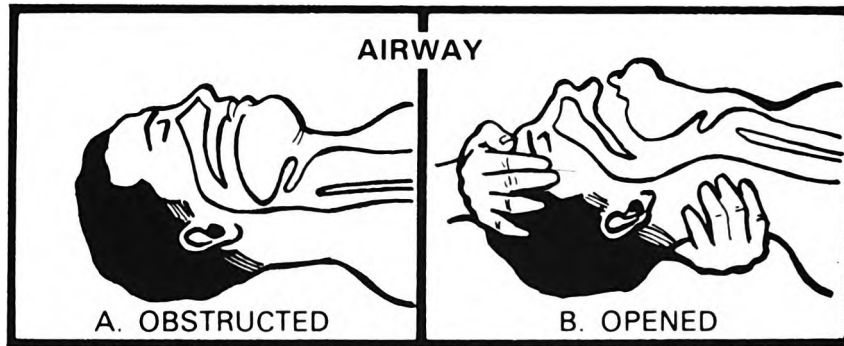
Situation 2--Properly apply mouth-to-mouth resuscitation and external heart massage using the ONE RESCUER method without assistance. Then shift to the TWO RESCUER method as assistance becomes available, and continue until the heartbeat and breathing are restored or until relieved, IAW performance measures below.

**PERFORMANCE MEASURES:**

1. Apply mouth-to-mouth resuscitation.

a. Upon finding an unconscious person, the rescuer must determine if the victim is breathing.

b. The victim will be placed on his back with the rescuer kneeling alongside the victim's head. First clear the airway by inserting the fingers into the victim's mouth and removing any obstruction, then place one hand (hand nearest victim's feet) under the victim's neck and the other hand on the victim's forehead. By lifting with the hand under the neck and pushing down on the forehead, the neck is extended, the tongue is lifted away from the back of the throat, and the airway is opened (figure 1).



*Figure 1.*

c. After opening the airway, LOOK, LISTEN, and FEEL to determine if the victim is breathing. To do this, place the ear close to the victim's mouth and nose (figure 2).



*Figure 2.*

Hold this position for 5 seconds since it could be 5 seconds between the victim's breaths.

(1) LOOK to see if the victim's chest is rising and falling as he exhales.

(2) LISTEN and FEEL for exhaling of air on the ear and cheek.

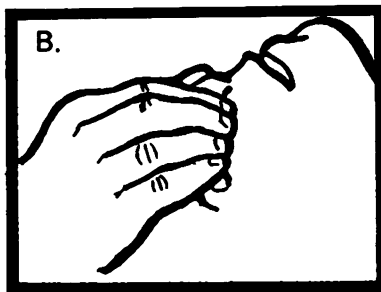
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d. If there are no signs of respiration, begin mouth-to-mouth resuscitation.

(1) To perform mouth-to-mouth resuscitation, the rescuer will use the hand under the victim's neck to maintain the head in a position of maximum backward tilt and continue to press down on the victim's forehead with the other hand (figure 3), and rotate this hand so that the victim's nostrils can be pinched together between the thumb and index finger (figure 4). The rescuer opens his mouth wide, takes a deep breath, places his mouth over the victim's mouth, makes an airtight seal with his lips, and blows into the victim's mouth (figure 5).



*Figure 3.*

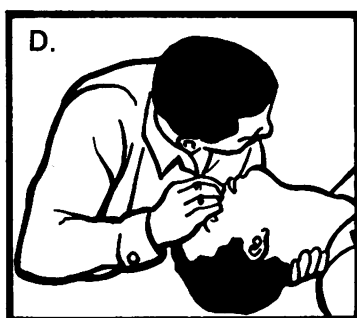


*Figure 4.*



*Figure 5.*

(2) The rescuer will then remove his mouth, turn his head, and again LOOK, LISTEN, and FEEL for the exhaled air (figure 6).



*Figure 6.*

(3) This procedure will be repeated once every 5 seconds for as long as needed.

**NOTE:** When starting artificial respiration, the first time the rescuer blows in the victim's mouth, he will give four quick but full breaths to make sure the victim's lungs are fully inflated.

e. If, when starting the procedure, strong resistance is felt when the rescuer blows into the victim's mouth, quickly reposition the victim's head and try again. If airway is still not clear, roll the victim onto his side; using heel of hand, deliver sharp blows between his shoulder blades to dislodge foreign objects. If abdomen bulges (air going into stomach), apply gentle pressure on abdomen with hand to force air out of stomach. If this procedure causes the victim to vomit, quickly turn him onto his side, clean out his mouth, and resume the cycle.

**NOTE:** The procedures for opening the airway and performing artificial respiration for children are essentially the same as those for adults, but there are some differences. For infants and small children, the rescuer covers both the mouth and nose of the child with his mouth and uses small breaths with less volume to inflate the lungs once every 3 seconds. The neck of an infant is so pliable that forceful backward tilting of the head may obstruct the breathing passages. Therefore, the tilted position should not be exaggerated. For an infant or small child, the head tilt may be assisted by the rescuer's placing one hand beneath the victim's shoulders.

2. Apply mouth-to-mouth resuscitation and external heart massage.

a. Upon finding an unconscious casualty, in addition to checking to see if he is breathing, the rescuer should also determine if he has a heartbeat.

b. First clear the airway by inserting the fingers into the victim's mouth and removing any obstruction, then open the airway and LOOK, LISTEN, and FEEL for breathing. At the same time, FEEL for a heartbeat. To do this, keeping the head in the tilted back position, remove the hand under the neck (hand closest to the victim's feet) and place the fingers on the victim's throat. Feel for the ADAM'S APPLE, and slide the fingers down from the ADAM'S APPLE to the side of the throat (figure 7). This will place the fingertips over the carotid artery where the carotid pulse can be felt. If a pulse cannot be felt, CARDIOPULMONARY RESUSCITATION (CPR) must be started immediately.

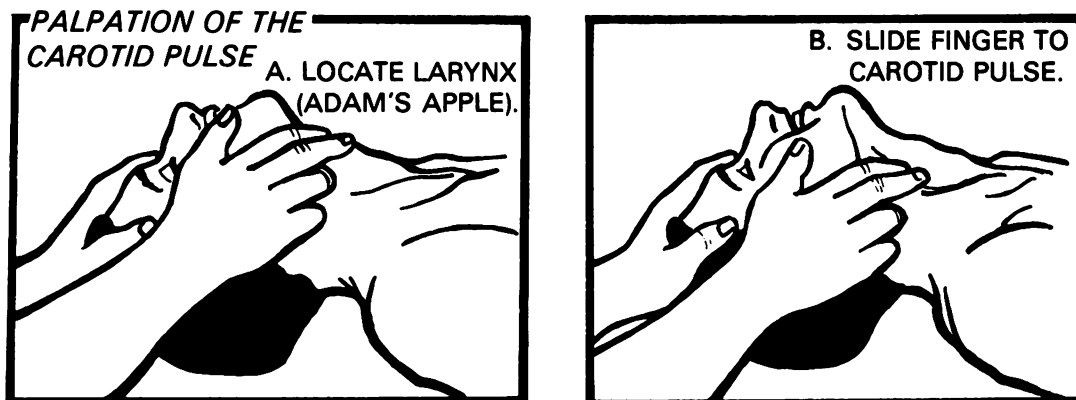


Figure 7.

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c. It is important that CPR be started quickly as permanent brain damage may occur if deprived of oxygenated blood.

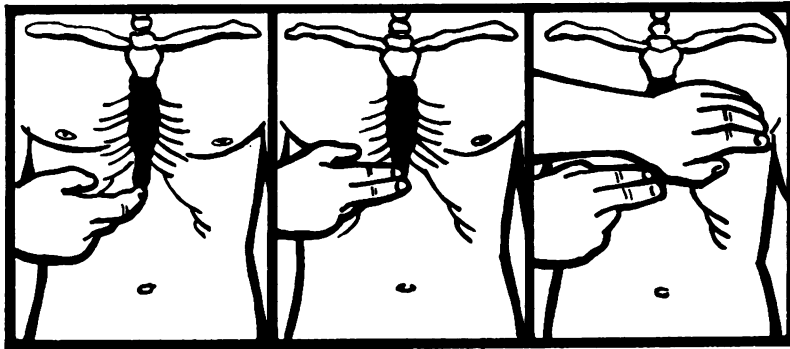
0-4 Min	4-6 Min	6-10 Min	Over 10 Min
BRAIN DAMAGE NOT LIKELY	BRAIN DAMAGE PROBABLE	BRAIN DAMAGE VERY LIKELY	BRAIN DAMAGE ALMOST CERTAIN

d. External heart massage is effective in providing artificial circulation because the heart lies between the breastbone and the backbone. When the chest is compressed, the heart will be squeezed, forcing blood through the lungs, brain, and body.

e. To perform the ONE RESCUER procedure of mouth-to-mouth resuscitation and heart massage, the rescuer will kneel at the victim's side.

(1) He will apply four quick, but full breaths to the victim to fill the lungs with oxygen (head must be tilted and airway open).

(2) He will apply 15 compressions of the chest at a rate of 80 counts per minute. To do this, the rescuer must locate the correct position for the hands. (If the hands are too high or too low on the chest, the heart will not be compressed.) To locate the correct position for the hand, first locate the tip of the breastbone and measure two finger-widths up from this tip. Place the heel of the other hand alongside the fingers (figure 8).



*Figure 8.*

**NOTE:** The tip of the breastbone can be felt through the victim's clothing.

(3) After placing the one hand in the correct position, place the other hand on top of the first hand and interlace the fingers (figure 9).

(4) When the upper part of the body is brought forward, the arms will become vertical and the elbows will be kept locked as the weight of the upper body is applied to the chest. The chest of the victim will be compressed  $1\frac{1}{2}$  to 2 inches (figure 10).

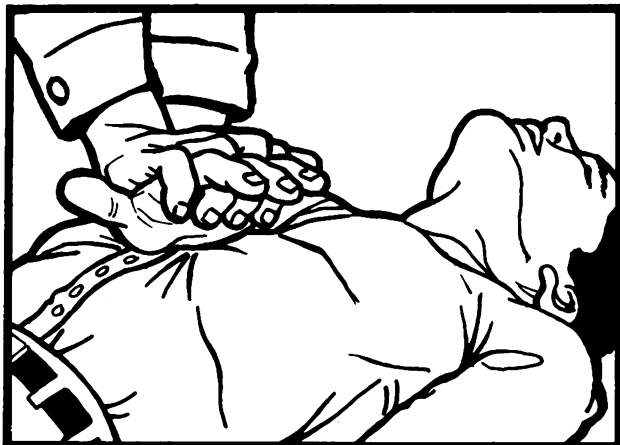


Figure 9.

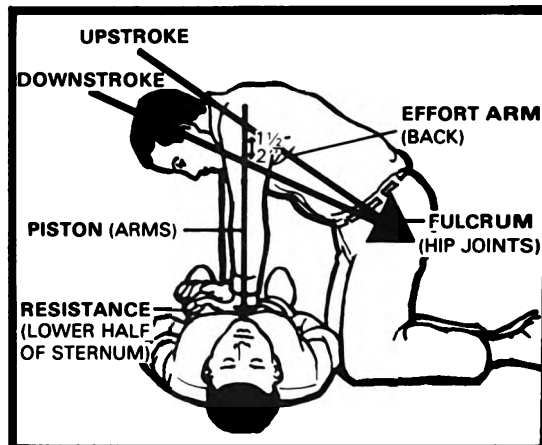


Figure 10.

(5) The chest will be compressed 15 times at a count of 80 compressions per minute. Then shift position slightly and apply two quick, but full breaths (tilt head, open airway). Continue this cycle-15 compressions to two breaths-until relieved (figure 11).

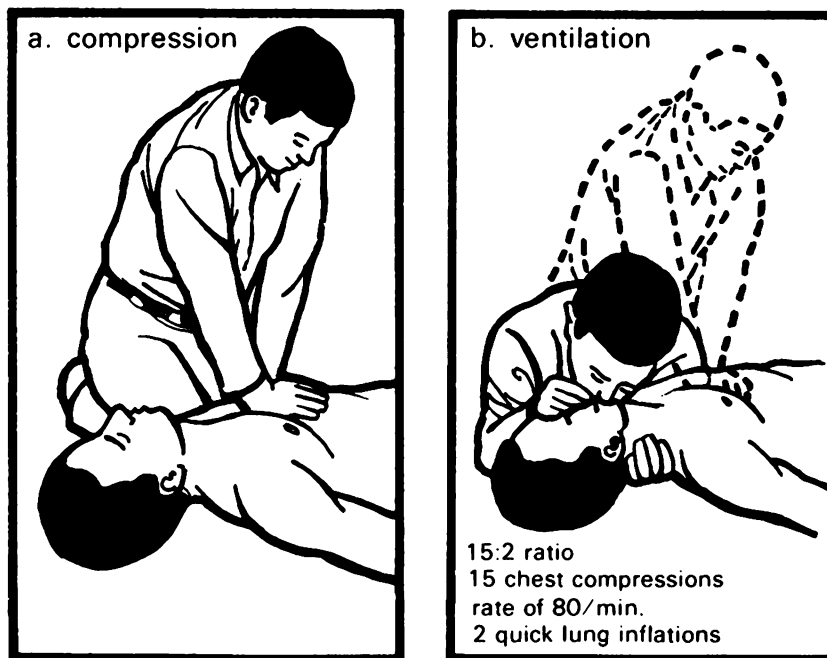
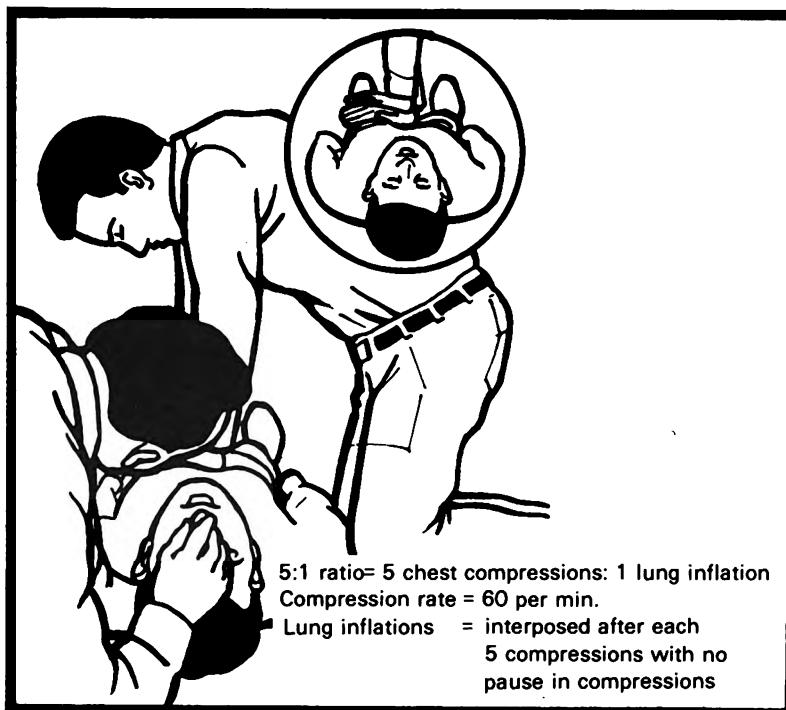


Figure 11.

f. If someone arrives to help, start the TWO RESCUER method. In this method, one rescuer does the compressions and one does the breathing for the victim.

(1) To do this, the assistant will get on the opposite side of the victim and take over the breathing. When this happens the cycle will change to five compressions to two breaths (figure 12).



*Figure 12.*

(2) As the one giving the compressions tires, the two rescuers will change positions. The cycle should not be broken during this exchange of positions. The one giving the compressions will control the change using some signal. Since he will be counting aloud as he does the compressions, counting ONE to FIVE, he can say, "CHANGE ON THREE NEXT TIME." By using the five-word phrase, he will not lose count of the compressions. This lets the one giving the breaths know that they will change the next time he hears "THREE".

**NOTE:** In the TWO RESCUER method, the lung inflations must be given on count FIVE as the one giving the compressions releases pressure from the chest.

#### REFERENCE:

FM 21-11, First Aid for Soldiers, Jun 76 (chap 3, pages 11-28)  
 TC 21-11, Pocket Medic, Feb 77 (part 1, pages 12-13 and 16-19)  
 TEC Lesson 911-441-0026-F, Basic First Aid Measures: Restoring the Breathing  
 TEC Lesson 911-441-0027-F, Basic First Aid Measures: Restoring the Heartbeat



**TASK NUMBER: 081-831-1005****STOP BLEEDING (ARM OR LEG)****CONDITIONS:**

Given a casualty with a bleeding arm or leg wound and requiring no other first aid; field first-aid dressings or any available cloth; material to apply a tourniquet if required; and the absence of qualified medical personnel.

**STANDARDS:**

Perform the lifesaving measure of stopping the bleeding IAW with the performance measures below.

**PERFORMANCE MEASURES:**

**1. Check for more than one wound.**

A missile usually makes smaller wound where it enters than where it exits.



**2. Cut and lift clothing from wound.**

Tearing clothing results in rough handling of injured part.



**3. Prevent further contamination of wound. Don't touch wound.**

Any attempt to clean wound only contaminates it more. If found dirty, leave dirty.

★ **NOTE:** Material marked in this manner is different or not included in the 11B and 11C Soldier's Manuals.

**4. Cover wound and apply pressure.**

- (a) After you cut and lift clothing from wound, remove wrapped dressing (with attached bandages) from plastic envelope; then twist to break paper wrapper.



- (b) Grasp folded bandages with hands, being careful not to touch side of dressing which goes next to wound.



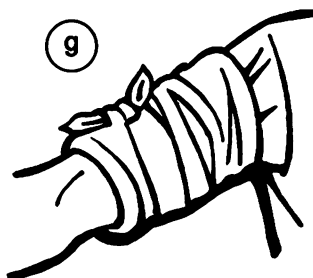
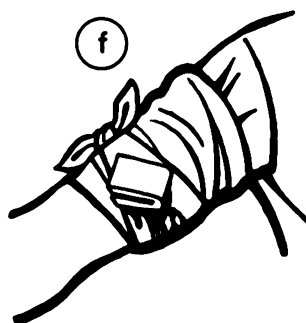
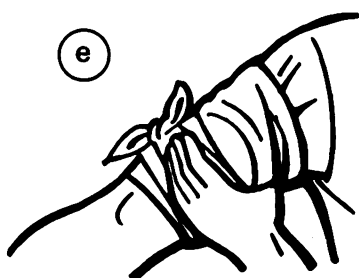
- (c) Place dressing on wound without allowing it to touch anything else.



- (d) Wrap bandages around the part and tie ends securely with square knot.



**NOTE:** The bandages attached to field first aid dressing are split 4-6 inches from the loose ends. They may be split farther to make four tails long enough for securing bandages around the head.



If bleeding continues, press wound with hand for 5-10 minutes.

Additional pressure can be applied to wound with thick pad (rag) firmly secured with a strip of material.

**NOTE:** If no first aid dressing is available, use any available cloth. Once dressing is applied, don't remove.

### Elevation of Wounded Limb

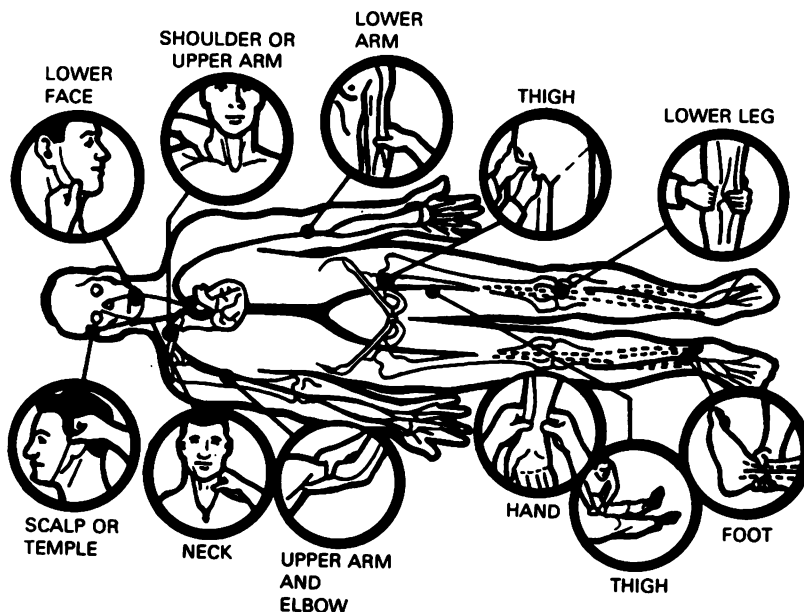
Raising injured part above level of heart lessens bleeding. If there is a broken bone in limb, do not raise it until it has been properly splinted.



### Digital Pressure

(Pressure with fingers, thumbs, or hands)

If blood is spurting from wound (artery), press at the point or site where main artery supplying the wounded area lies near skin surface or over bone as shown below. This pressure shuts off or slows down the flow of blood from the heart to the wound until a pressure dressing can be unwrapped and applied. You will know you have located the artery when you feel a pulse.



### ★ 5. Stop bleeding, using a tourniquet.

**CAUTION:** A tourniquet is the most extreme method of stopping bleeding. The use of a tourniquet can cause severe damage to blood vessels and nerves and can even cause the loss of an arm or leg. The only times you should ever apply a tourniquet are when an arm or leg has been cut off or when there is very heavy bleeding which cannot be stopped by the pressure methods described above.

a. Place the tourniquet. The tourniquet must be applied between the wound and the heart. The object is to stop bleeding and save as much of the arm or leg as possible.

(1) If an arm or leg has been cut off *below* the elbow or *below* the knee: Place the tourniquet above the elbow joint or knee joint to get good bleeding control and to keep the tourniquet from slipping off.

(2) If the arm or leg has been cut off *above* the elbow or the knee: Place the tourniquet as close as you can to the wound and still be able to get a firm hold on the arm or leg so that the tourniquet will not slip off.

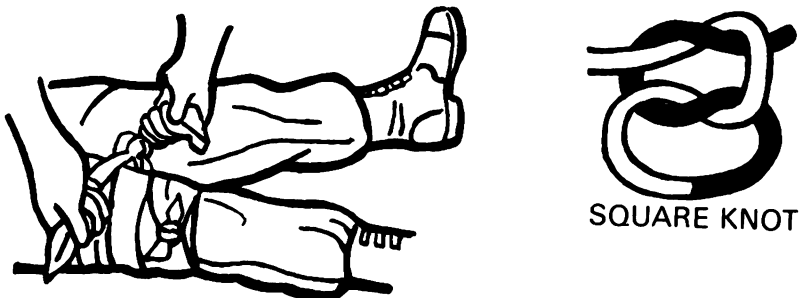
**CAUTION:**

**If only part of a hand or foot has been cut off, you should stop the bleeding using the pressure methods.**

(3) If a wound is bleeding very heavily and you have not been able to stop the bleeding using the pressure methods: Place the tourniquet as close as you can to the edge of the wound.

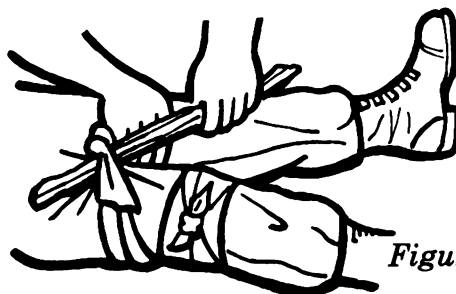
★ b. Tighten the tourniquet.

(1) Tie the tourniquet loosely around the limb, using a square knot as shown in figure.



*Figure 1. Tying tourniquet.*

(2) Place a rigid object, such as a stick, between the wound and the tourniquet, as shown in figure 2.



*Figure 2. Placing stick in tourniquet.*



(3) Twist the stick to tighten the tourniquet just enough to stop the bleeding, as shown in figure 3.



*Figure 3. Twisting stick to tighten tourniquet.*

- ★ c. Check the soldier's pulse at the wrist or ankle of the injured arm or leg. If you cannot feel the pulse, the tourniquet is tight enough.
- ★ d. Tie the tourniquet to the injured arm or leg as shown in figure 4.



*Figure 4. Stick tied to leg to prevent unwinding.*

**CAUTION:**

**The tourniquet must be tied to keep it from slipping or unwinding.**

- ★ e. Mark on the soldier's forehead, if possible, a "T" and the time the tourniquet was applied.
- ★ f. Get the soldier to medical help as soon as possible.
- ★ g. Keep the soldier from chilling or overheating, depending on the weather. If you must cover him, leave the tourniquet uncovered so it can be easily seen.

**CAUTION:**

**DO NOT LOOSEN THE TOURNIQUET AFTER IT HAS BEEN APPLIED.**

**REFERENCES:**

**FM 21-11, First Aid for Soldiers, Jun 76, (chap 4, pages 29-35)**

**TC 21-11, Pocket Medic, Feb 77 (part 1, pages 20-27)**

**TEC Lesson 911-441-0028-F, Basic First Aid Measures; Stopping the Bleeding, Part 1.**

**TEC Lesson 911-441-0029-F, Basic First Aid Measures; Stopping the Bleeding, Part 2.**

**TEC Lesson 911-441-0031-F, Dressings and Bandages, Part 1.**

**TEC Lesson 911-441-0032-F, Dressings and Bandages, Part 2.**

## TASK NUMBER: 081-831-1006

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**IDENTIFY SIGNS OF AND TREAT FOR SHOCK**


---

**CONDITIONS:**

Given the absence of qualified medical personnel and a casualty who shows signs of any of the following: restlessness, thirst, paleness of skin or rapid heartbeat.

**STANDARDS:**

Apply lifesaving measures to treat for shock IAW the performance measures below.

**PERFORMANCE MEASURES:**

**NOTE:** Shock may result from any injury but is more likely to develop in severe injuries.

<b>Warning signs:</b>	<b>May be:</b>	<b>Signs as shock gets worse:</b>
Restlessness	Excited or appear calm and tired	Small fast breaths or gasps
Thirst		Staring vacantly into space
Paleness of skin	Sweating when skin feels cool and clammy	Blotchy or bluish skin, especially around mouth
Rapid heartbeat		

1. **Maintain adequate respiration and heartbeat.** This may entail only clearing soldier's upper airway, positioning him to insure drainage of any fluid blocking airway, and observing him to insure airway remains clear. However, you may need to give him artificial respiration and closed-chest heart massage (TC 21-11, pages 12-19).

2. **Stop bleeding.** See task: **Stop Bleeding.**

3. **Loosen clothing** at neck, waist, and other places where it tends to bind. Loosen, but do not remove shoes.

**4. Reassure soldier.**

Take charge. Show by your calm self-confidence and gentle yet firm actions that you know what you are doing and that you expect him to feel better because you are helping him. If he asks questions about the seriousness of his injury, explain that a physician will have to examine him to determine the extent of injury. Ill-timed or incorrect information can increase a person's anxiety.

**5. Splint fractures. See task: Splint a Fracture.**

**6. Position soldier.**

(Splint any fracture first)

If conscious--On back with feet raised 6" to 8"

If unconscious--On side or abdomen with head turned to side.

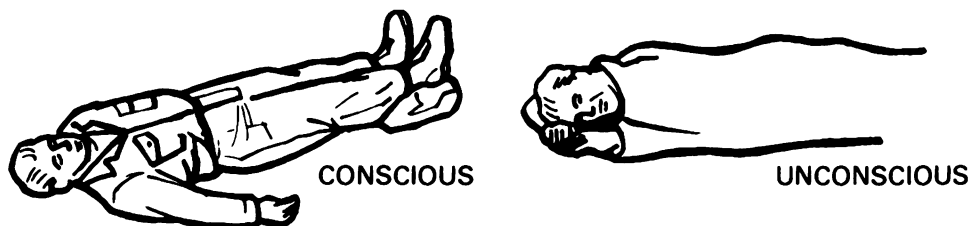
Vary position for:

Head injury--Head also raised higher than body.

Face and neck wound--Sit, lean forward with head down or in unconscious position.

Sucking wound of chest--Sit or lie on injured side.

Abdominal wound--On back with head turned to side.



**7. Keep soldier comfortably warm.**

Place suitable material (poncho, blanket, etc.) under him as well as over him if weather makes necessary. If weather permits, remove any wet clothing except boots.

**8. Get the soldier to medical help as soon as possible.**

**REFERENCES:**

FM 21-11, First Aid for Soldiers, Jun 76 (chap 5, pages 36-39)  
TC 21-11, Pocket Medic, Feb 77 (part 1, pages 28-29)  
TEC Lesson 911-441-0029-F, Basic First Aid Measures: Controlling for Shock

## TASK NUMBER: 081-831-1007

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**SPLINT A FRACTURE**

---

**★ CONDITIONS:**

Given a casualty who has a suspected fracture (closed or open and material for field expedient splints. The necessary lifesaving measures have already been performed and no qualified medical personnel are available.

**★ STANDARDS:**

Splints are applied to the suspected fracture (open or closed) IAW performance measures below without cutting off blood circulation so that the joints above and below the fracture cannot be moved.

**TRAINING NOTE: Fractures**

Closed fracture: Break in bone without break in overlying skin.

Open fractures: Break in bone as well as overlying skin.

Fractures must be splinted (immobilized) to prevent razor-sharp edges of bone from moving and cutting tissue, muscle, blood vessels, and nerves; to reduce pain and help control shock; and to prevent closed fractures from becoming open fractures.

**First Aid:**

1. "Splint them where they lie" - Splint (immobilize) fractured part without changing position of part and before moving injured person. If bone is in unnatural position, do not straighten it. If person must be moved to save his life, such as from enemy fire or a burning building, tie fractured part, grasp him under arm pits and pull him in straight line.

2. Apply splint so joint above fracture and joint below fracture are immobilized.

3. Use padding between injured part and splint.

4. Secure splint to part with bandages at several points above and below fracture (NOT across fracture); tie bandages against splint with square knot.

5. Use sling to support splinted arm bent at elbow and fractured elbow which is bent.

**★ NOTE: Material marked in this manner is different or not included in the 11B and 11C series Soldier's Manuals.**

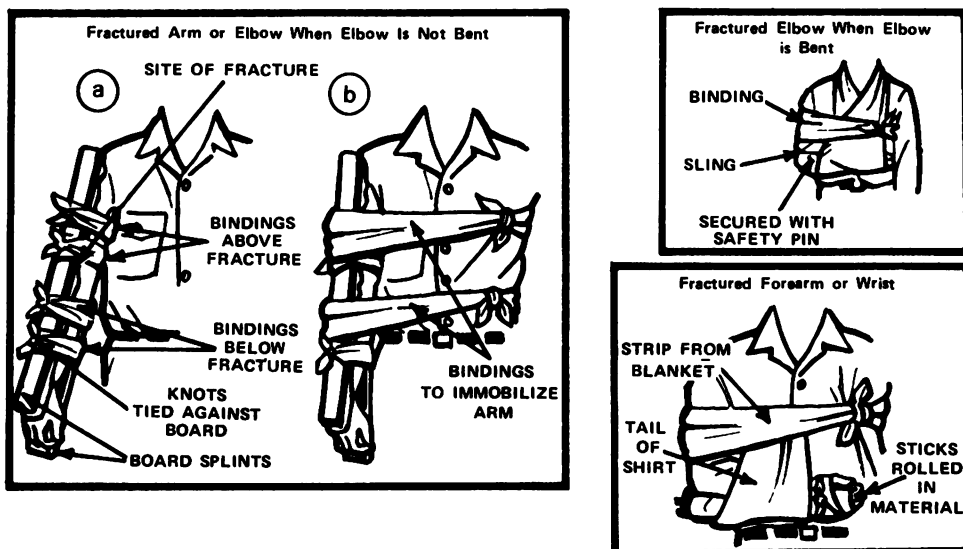
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## ★ PERFORMANCE MEASURES:

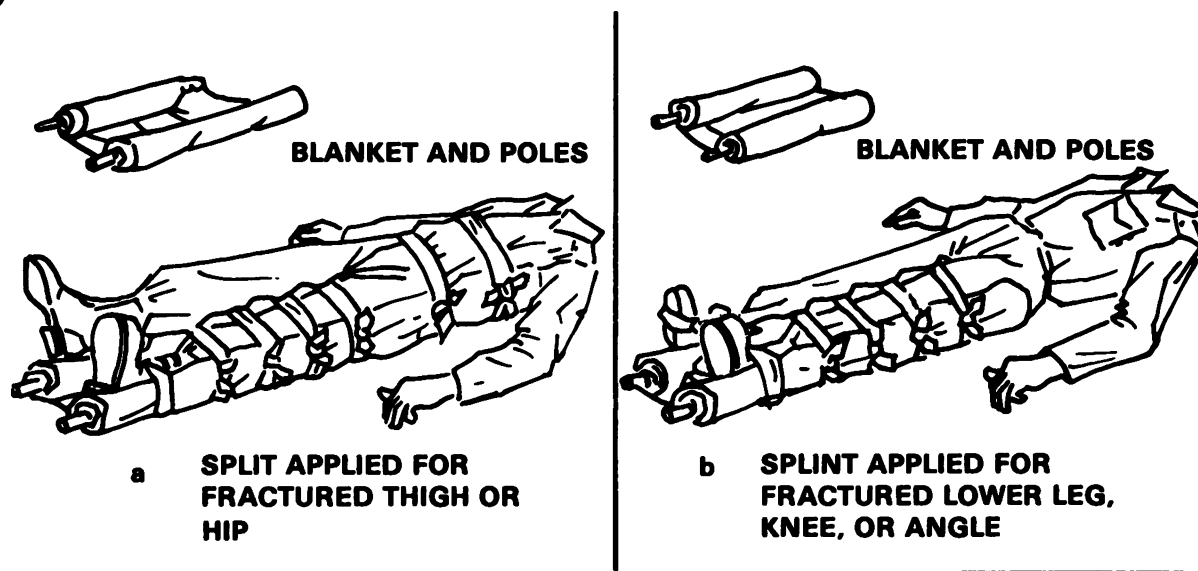
1. Check for other injuries and do any necessary lifesaving measures.
  - a. Try not to move soldier, unless absolutely necessary, until the suspected fracture has been splinted.
  - b. Cover any wound with a sterile dressing or clean handkerchief.
2. Loosen clothes, but do not move the fractured part.
3. Get splints, padding, and bandages. Make sure splints are long enough to immobilize the joints above and below the suspected fracture.
  - a. When no materials are available to splint a fractured leg, the victim's uninjured leg may be used as a splint by securing it to the fractured leg, in accordance with the performance measures.
  - b. When the victim has a suspected fracture of the ankle, the boot acts as a splint and should not be removed.
4. Pad the splints. This is very important when the splint will touch bony areas (elbow, wrist, knee, or ankle) or the crotch area or armpit. If padding material is not available, splint without padding.
5. Put on the splint with the fractured arm or leg in as normal a position as possible. See figures 1 and 2.

**NOTE:** If suspected fracture is at or near a joint, or the bone is in an unnatural position, do not move the joint or straighten the bone. Splint in the position found.

### FRACTURED ARM, ELBOW, OR WRIST



*Figure 1. Fractured forearm or wrist splinted with sticks and supported with tail of shirt and strips of material.*



*Figure 2. Application of splints to lower extremity fractures, using poles rolled in a blanket.*

6. Tie splint securely in place with strips of cloth.

a. Tie splint above and below the suspected fracture as shown in figures 1 and 2. Do not tie a cloth directly over the fracture.

b. Tie all bandages so that knot is against the splint. Do not tie splints too tight.

7. Check the pulse below the fracture site. Loosen bandages if pulse cannot be detected.

8. Get soldier to medical help as soon as possible. Keep him warm.

**NOTE:** Watch soldier for signs of shock. See task: Identify Signs of and Treat for Shock for additional first aid measures.

## REFERENCES:

FM 21-11, First Aid for Soldiers, Jun 76, (chap 8, pages 66-67)  
 TC 21-11, Pocket Medic, Feb 77 (part 2, pages 44-48)  
 TEC Lesson 911-441-0030-F, Fractures and Splinting





**TASK NUMBER: 081-831-1008**

---

**APPLY FIRST-AID MEASURES FOR BURNS**

---

**★ CONDITIONS:**

During daylight in a field location, given a casualty or dummy with a burn, two sterile dressings, and a canteen of cold water. The casualty is conscious, is not vomiting and has no other wounds. His clothing may or may not be stuck to the burn.

**★ STANDARDS:**

Administer first aid for burns IAW the performance measures below.

**PERFORMANCE MEASURES:**

1. Protect the burn against further contamination as follows to lessen the possibility of infection:

a. If clothing covers the burn, cut and lift it gently away without touching the burn.

(1) Do not try to remove pieces of cloth which have stuck to the burn or to clean the burn in any way.

(2) Do not pull clothes over the burned area.

(3) Do not break blisters.

(4) Do not put ointment or any medication whatsoever on the burn.

b. Place a sterile dressing over the burned area and secure it in place with bandages.

2. Prevent shock by applying the measures discussed in the task: Identify signs of and treat for shock.

3. The casualty may have water if he is—

a. not unconscious,

b. not vomiting or nauseated,

c. not wounded in the stomach or neck.

**★ NOTE: Material marked in this manner is different or not included in the 11B and 11C series Soldier's Manuals.**

**NOTE: Paragraph 3 is not IAW the referenced material; this change will be reflected in the next revision of source documents.**

4. Get the casualty to a medical treatment facility as soon as possible.

**REFERENCES:**

**FM 21-11, First Aid for Soldiers, Jun 76 (chap 7, pages 61-62)**  
**TC 21-11, Pocket Medic, Feb 77 (part 2, page 43)**  
**TEC Lesson 911-441-0033-F, Burns and Eye Injuries**

## TASK NUMBER: 081-831-1010

---

**APPLY FIRST AID FOR SUN OR HEAT INJURIES**

---

**★ CONDITIONS:**

Given a casualty suffering from a heat injury (heat cramps, heat exhaustion, heat stroke), a canteen of water, and salt tablets or table salt.

**STANDARDS:**

Casualty's signs and symptoms are identified in accordance with the performance measures and initial care is begun immediately to reduce the seriousness of the injury.

**PERFORMANCE MEASURES:**

Identify type of injury.

**1. Heat cramps.**

a. Signs/symptoms - Muscle cramps of abdomen, legs, or arms.

b. First aid.

(1) Move casualty to shade and loosen clothing.

★ (2) Give the soldier 2 salt tablets and have him drink a canteen of cool water.

**NOTE:** If salt tablets are not available, mix  $\frac{1}{4}$  teaspoon of table salt in the canteen of water.

**CAUTION:** Have the soldier drink the water slowly. Do not give salt tablets unless you can give the soldier at least a half canteen of water.

★ (3) Instruct the soldier to increase the amount of salt taken with his rations.

★ **NOTE:** Material marked in this manner is different or not included in the 11B and 11C series Soldier's Manuals.

**2. Heat exhaustion.**

a. Signs/symptoms - Headache, excessive sweating, weakness, dizziness, nausea, muscle cramps. Pale, cool, moist clammy skin.

b. First aid.

(1) Lay casualty in cool shaded area and loosen his clothing.

★ (2) Raise his feet about 12 inches.

★ (3) Give salt and water as described in 1b above.

(4) Get the casualty to a medical treatment facility as soon as possible.

**NOTE: For units isolated and not able to evacuate casualty: if he is conscious, have him drink 3 to 5 canteenfuls of cool salt water during a period of 12 hours.**

**3. Heat stroke (sunstroke).**

a. Signs/symptoms-Stoppage of sweating (hot, dry skin). Collapse and unconsciousness may come suddenly or may be preceded by headache, dizziness, fast pulse, nausea, vomiting, and mental confusion.

b. First aid.

(1) Promptly immerse person in coldest water available. Add ice, if available, to water. If you cannot immerse him, get him into shade, remove his clothing, keep his entire body wet by pouring water over him, and fan his wet body continuously.

(2) Transport him to nearest medical facility at once, cooling his body on the way.

(3) If he becomes conscious, give him cool salt water prepared as described for "heat cramps".

**NOTE: If casualty becomes nauseated, stop giving him the solution but keep it available for him to drink later.**

**REFERENCES:**

FM 21-11, First Aid for Soldiers, Jun 76 (chap 9, pages 84, 88-90)  
TC 21-11, Pocket Medic, Feb 77 (part 3, pages 59-60)  
TEC Lesson 911-444-0034-F, Snake Bites and Hot Weather Hazards

## TASK NUMBER: 081-831-1011

---

**APPLY FIRST AID FOR WET OR COLD INJURIES**

---

**CONDITIONS:**

Given a casualty suffering from a wet or cold injury (frostbite, immersion foot, trench foot, snow blindness).

- ★ **NOTE:** Immersion/trench foot is caused by constant wetness of the feet for long periods of time.

**STANDARDS:**

Casualty's signs and symptoms are identified in accordance with the performance measures and initial care is begun immediately to reduce the seriousness of the injury.

**PERFORMANCE MEASURES:**

Identify type of injury.

**1. Frostbite.**

a. Signs/symptoms - Skin is white, stiff, and numb.

b. First aid —

(1) Cover frostbitten part of face with warm hands until pain returns.

(2) Place frostbitten bare hands next to skin in opposite armpits.

(3) If feet are frostbitten, seek sheltered area and place bare feet under clothing and against abdomen of another person.

★ (4) If deep frostbite is suspected, protect part from additional injury and get to medical treatment facility by fastest means possible. **DO NOT** attempt to thaw deep frostbite. Do not walk on frostbitten feet unless absolutely necessary.

**2. Immersion foot.**

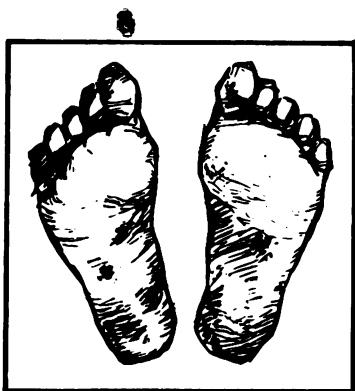
★ a. Signs/symptoms — Soles of feet are wrinkled. Standing or walking is extremely painful. The feet also may be numb, painful, swollen, aching, or cramping.

- ★ **NOTE:** Material marked in this manner is different or not included in the 11B and 11C series Soldier's Manuals.

b. First aid —

(1) Dry feet thoroughly and get to medical treatment facility by fastest means possible.

(2) Avoid walking if possible.



*Figure 1. Immersion foot.*



*Figure 2. Trench foot.*

3. Trench foot.

a. Signs/symptoms - Numbness. May be tingling or aching sensation, cramping pain, and swelling.

b. First aid —

(1) Dry feet thoroughly and get to medical treatment facility by fastest means possible.

(2) Avoid walking if possible.

4. Snow blindness.

a. Signs/symptoms - Scratchy feeling in eyes.

b. First aid —

(1) Cover eyes with dark cloth.

(2) Transport casualty to medical treatment facility at once.

**REFERENCES:**

FM 21-11, First Aid for Soldiers, Jun 76 (chap 9, pages 90-91)  
TC 21-11, Pocket Medic, Feb 77 (part 3, page 61)  
TEC Lesson 911-441-0035-F, Cold Weather Hazards

## TASK NUMBER 092-503-1001

---

**PERFORM OPERATOR'S MAINTENANCE ON AN M17 SERIES  
PROTECTIVE MASK**

---

**CONDITIONS:**

Given an M17 series protective mask, carrier, accessories authorized to be stored in the carrier (per unit SOP), TM 3-4240-279-10, a pail of soapy water, a pail of clear rinse water, rags, and a small brush.

**STANDARDS:**

1. All components and accessories authorized by unit SOP are present; any which are missing are reported to your supervisor.
2. All deficiencies not requiring higher echelon support have been corrected. Those which do require such support are reported to your supervisor.
3. Mask and carrier are free of dirt, sand, and grit.

**PERFORMANCE MEASURES:**

1. **To inspect mask and carrier.**
  - a. Remove the mask from the carrier and check to insure that all components are present (figure 1). Insure that accessories authorized by your unit SOP are present (figure 2). Inform your supervisor if any components or accessories are missing.
  - b. Check the carrier for dirt, mildew, rips, torn straps, and missing hardware.
  - c. Check the facepiece for holes, tears, splits, and signs of deterioration of rubber parts.
  - d. Check the filter elements to make sure that they are serviceable and properly installed.
  - e. Check outserts for scratches, discoloration, or distortion that could affect vision.
  - f. Check the head harness for dirt and mildew; worn, frayed, or broken straps; and missing clinch tips.
  - g. Check the hood (if present) for holes, rips, tears, or excessive wear. The hood is unserviceable if it has more than two pinholes in any one panel.
  - h. Correct deficiencies which you are authorized to correct at your level (see TM 3-4240-279-10, sec III, page 3-5 through 3-12).

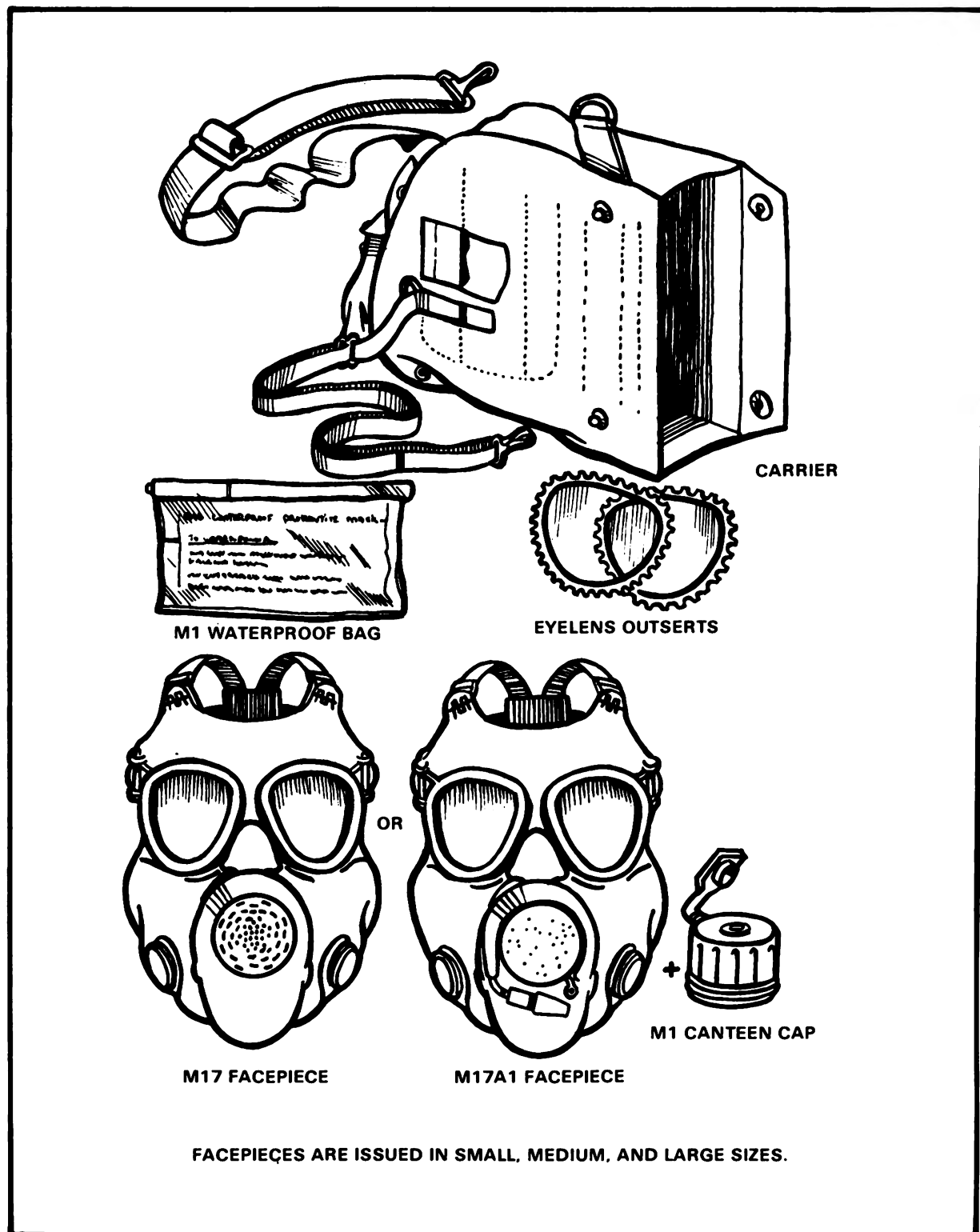
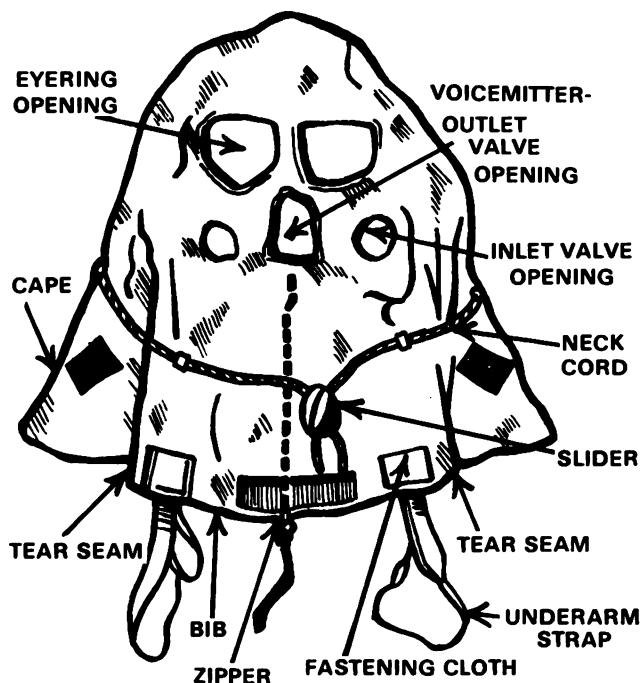


Figure 1.

2-I-B-1.2

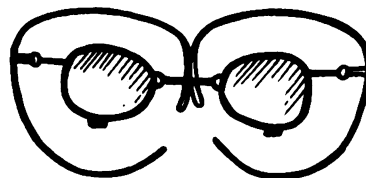


**ABC-M6A2-FIELD CB MASK HOOD**

PROTECTS AREAS OF YOUR HEAD AND NECK, NOT COVERED BY YOUR MASK, AGAINST CB AGENT VAPORS, AEROSOLS, AND DROPLETS

**OPTICAL INSERTS**

AVAILABLE BY MEDICAL PRESCRIPTION. IF YOU MUST WEAR GLASSES, ASK YOUR SUPERVISOR TO LET YOU SEE TM 3-4240-270-20&P



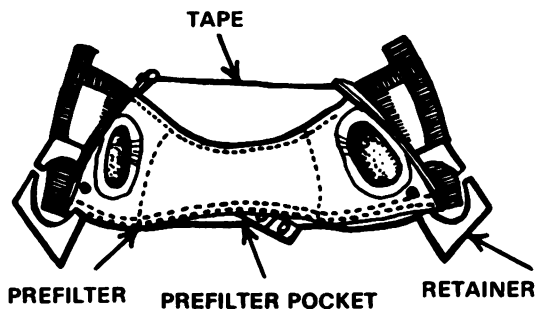
THIS STYLE IS DESIGNED FOR ABC-M17 MASKS AND WILL ALSO FIT M17A1 MASKS.



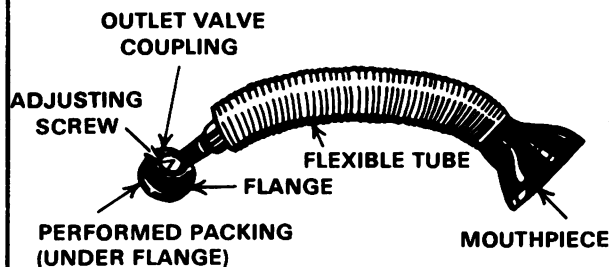
THIS STYLE WILL FIT M17A1 MASKS ONLY.

**ABC-M4 FIELD CB MASK WINTERIZATION KIT**

SPECIAL INLET VALVE DISKS & NOSECUP VALVE DISKS (STORED IN PREFILTER POCKET) WILL WITHSTAND EFFECTS OF EXTREME COLD



PREVENTS FROST ACCUMULATIONS ON INLET VALVES DURING SUBZERO WEATHER.

**M1 RESUSCITATION TUBE FOR M17A1 ONLY**

CONVERTS YOUR MASK INTO A LIFE-SAVING RESUSCITATION SYSTEM.

Figure 2.

**NOTE:** Depending upon your unit SOP, you will be authorized any or all of the accessories above.

i. Notify your supervisor of any deficiencies which must be corrected at a higher level.

**2. To clean the mask (without removing filter elements).**

a. Do not remove the hood if it is attached to the mask.

b. Remove the voicemitter-outlet cover, inlet valve caps, and eyelens outserts.

c. Clean the mask inside and out with a cloth dipped in warm, soapy water (wrung almost dry) or a brush with soft bristles, being careful not to wet the filter elements.

d. Rinse with a cloth dipped in warm, clear water (wrung almost dry).

e. Wipe the facepiece with a clean, lint-free cloth or air-dry.

f. If the nosecup valve disks become detached while the mask is being cleaned, reinstall them.

g. Reassemble the mask.

**3. To clean the carrier.**

a. Empty the carrier pockets.

b. Brush the carrier both inside and outside to remove sand or grit.

c. If the carrier is soiled, clean it with a brush dipped in clear, cold water.

d. Allow carrier to air dry.

e. Put components and authorized accessories back in the carrier.

**REFERENCES:**

**FM 21-40, NBC (Nuclear, Biological, and Chemical) Defense, Oct 77, (app B, pages B-4 to B-6)**

**TM 3-4240-279-10, Mask Chemical-Biological Field, ABC-M17A1, M17 and Accessories, Aug 75 (chap 3, pages 3-1 to 3-14)**

**TEC Lesson 931-061-0065-A, NBC: Maintenance of the M17 Series Mask**

**TASK NUMBER: 092-503-1010****EXCHANGE FILTERS ON AN M17 SERIES  
PROTECTIVE MASK****CONDITIONS:**

Given an M17 series protective mask with filters that have been exposed to chemical agents, immersed in water, or damaged, and a pair of M13 series replacement filters.

**STANDARDS:**


1. Exchange the spare set of M13 series filters with those in the mask and perform a function check IAW the performance measures below.
2. Upon initiation of chemical warfare, filters are replaced at least once every 30 days.

**PERFORMANCE MEASURES:**


1. The M17 series mask has two M13 series filter elements installed in the left and right cheek pouches. These filter elements provide protection to the wearer from all known toxic chemical agents. But when exposed to agents for long periods of time, or repeatedly, they break down and must be replaced. In any future conflict, the individual soldier must be able to exchange the filter elements himself.
2. To remove the filter elements in the M17 series mask, follow the steps outlined in figure 1.

① REMOVE INLET VALVES BY PUSHING UP ON BOTTOM EDGE OF VALVE FLANGE WITH THUMBS.

② WORK COLLAR FROM UNDER FILTER ELEMENT CONNECTOR FLANGE.



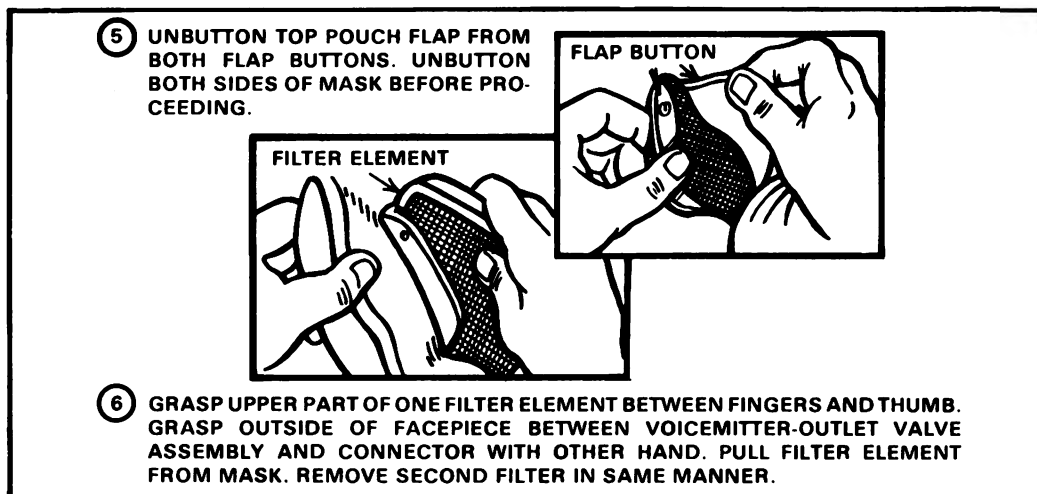
③ REVERSE HEAD HARNESS BY LENGTHENING ALL STRAPS AND LOOPING HARNESS OVER FRONT OF MASK. TO AVOID DISTORTION, DON'T PULL PAD BELOW LENSES.



④ UNBUTTON NOSE CUP FROM FLAP BUTTON.

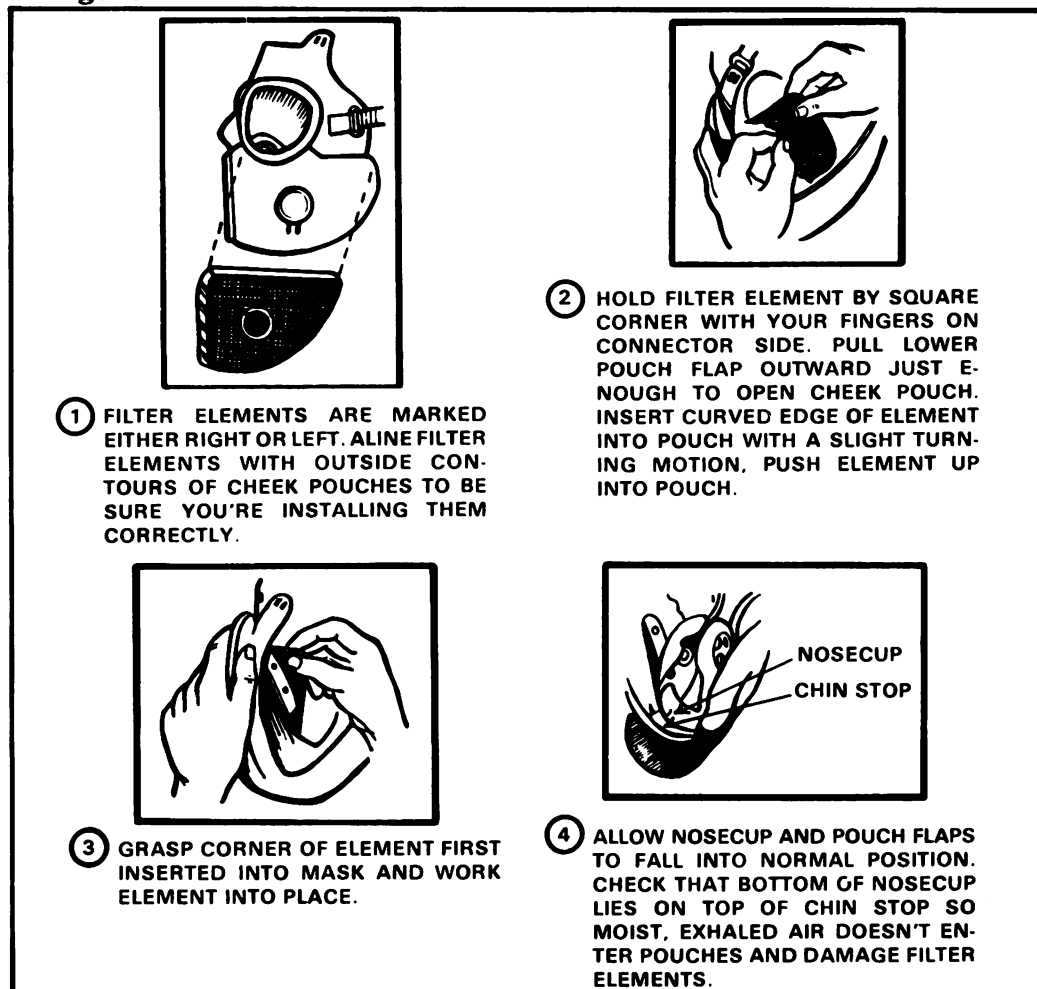
**NOTE:** TO AVOID TEARS, DON'T STRETCH RUBBER ANY MORE THAN NECESSARY TO REMOVE OR INSTALL MASK COMPONENTS.

*Figure 1. Removing filter elements.*

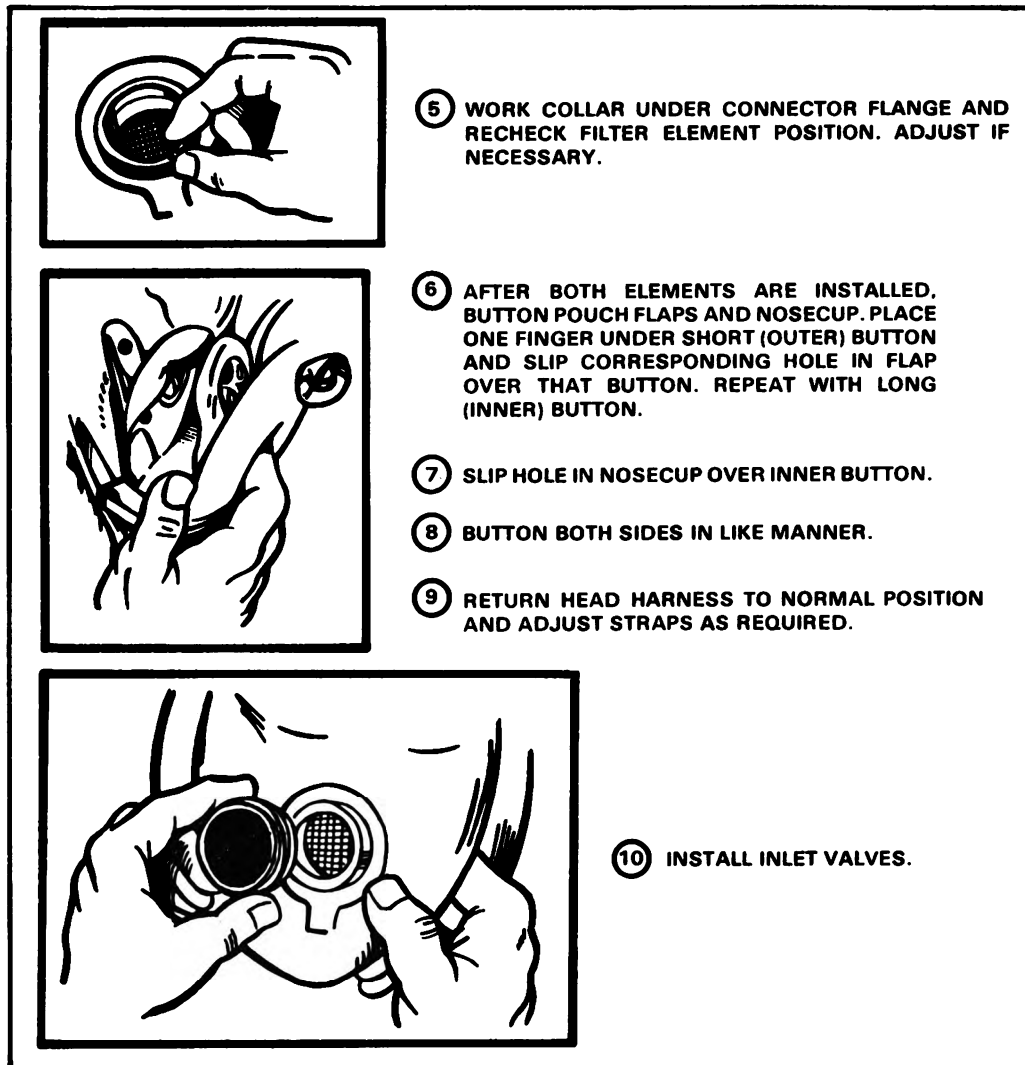


*Figure 1. Con't.*

3. To replace the filter elements, follow the steps outlined in figure 2.



*Figure 2. Installing filter elements.*



*Figure 2. Con't.*

4. To perform a function test, follow these steps:
  - a. Put on the mask.
  - b. Clear the mask.
  - c. Check the seal.
  - d. If you cannot obtain a seal or cannot breathe, check to see if the mask has been reassembled properly.
  - e. If the difficulty still exists, notify your supervisor.

#### REFERENCE:

TM 3-4240-279-10, *Operator's Manual Mask, Chemical-Biological: Field ABC M17/M17A1 and Accessories*, C1, Aug 75 (chap 3, sec III, page 3-6, 8)



**TASK NUMBER: 092-503-1002**

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**PUT ON AND WEAR A PROTECTIVE MASK**

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**CONDITIONS:**

In a field or garrison situation, wearing standard individual combat gear, to include a protective mask carrier worn in an authorized carrying position, containing a prefitted M17 series protective mask and given a standard alarm for an NBC attack or exposed to CS gas without warning.

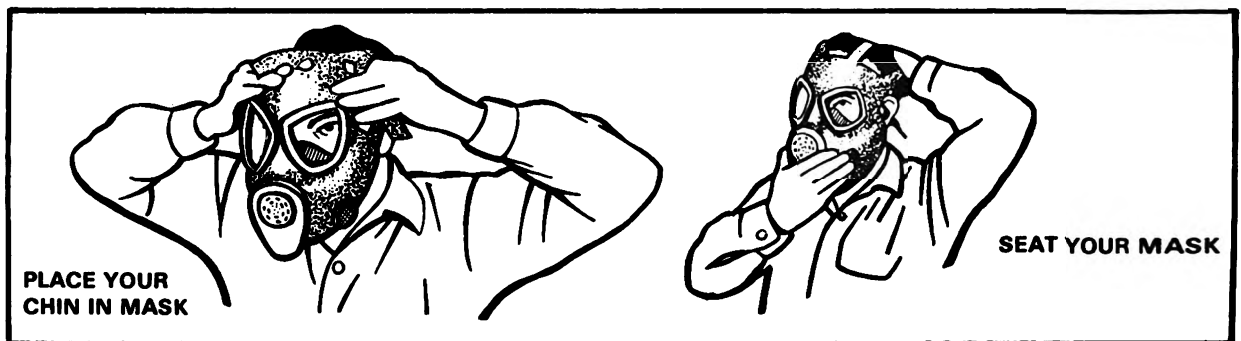
**STANDARDS:**

1. Within 9 seconds, put on, seat, and clear the protective mask.
2. Within an additional 6 seconds, secure the hood (if present) in accordance with the performance measures below.
3. Secure underarm straps to the hood (if present) before continuing the mission.

**NOTE:** If exposed to CS gas without warning, remain masked for an additional 2 minutes.

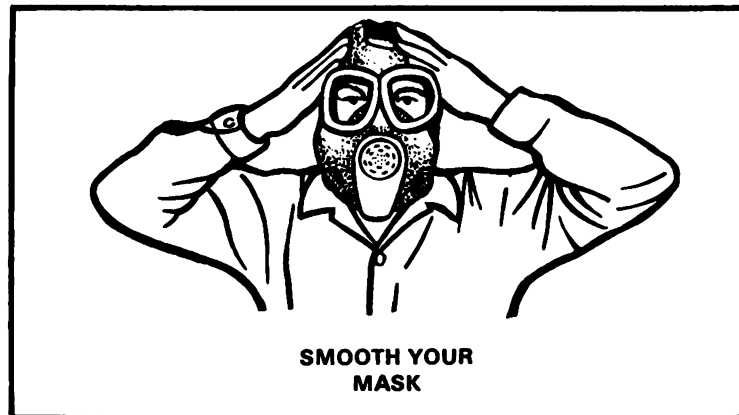
**PERFORMANCE MEASURES:**

1. Upon becoming aware of a chemical-biological attack:
  - a. Stop breathing.
  - b. Remove headgear, and open the carrier with the left hand. (Headgear may be placed between the legs or on the muzzle of a rifle held between the legs. This is important in a contaminated area and should be practiced in training. If dropped, however, continue to mask and decontaminate the equipment afterward.)
2. Hold the carrier open with the left hand and with the other grasp the mask just below the eyepieces and remove the mask.
3. Grasp the facepiece with both hands, sliding the thumbs up inside, so that the facepiece is open to the fullest extent.
4. Place chin in the chin pocket, then pull the head harness over the head, making sure that all head straps are straight and the head pad is centered (figure 1).



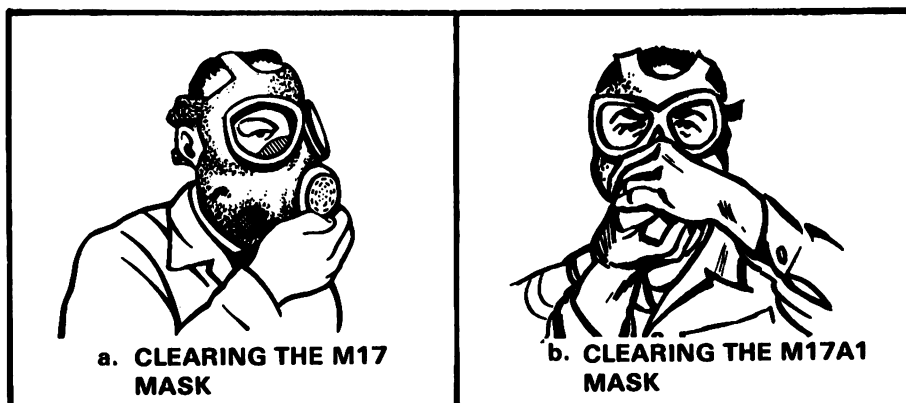
*Figure 1.*

5. Smooth the edges of the facepiece on the face with an upward and backward motion of the hands, pressing out all bulges to get an airtight seal (figure 2).



*Figure 2.*

6. Clear the mask (M17) by placing the palm of one hand over the bottom of the outlet valve cover and blowing hard to clear any agent inside the mask. Clearing the M17A1 also requires covering the voicemitter assembly with the other hand (figure 3).



*Figure 3.*

2-I-B-3.2



7. Check for leaks by placing the palms of the hands over the two inlet valve assemblies and breathe in slowly. If there are no leaks, the facepiece will collapse against the face (figure 4).



*Figure 4.*

8. Secure the protective hood (if present) by pulling the hood over the shoulders, zipping it, and adjusting the drawstrings. Before continuing the mission, pull the straps forward, under the arms, and attach the ends to the velcro patches on the front of the hood.

9. Replace the headgear.

10. Sound the appropriate alarm, and continue the mission.

**NOTE TO TRAINERS:** This task is designed to familiarize the soldier with the difficulty involved in performing his normal duties while masked. Time should be allowed for the soldier to remain in the mask initially for 1 hour and work up to at least 6 consecutive hours.

#### **REFERENCES:**

- FM 21-40, NBC (Nuclear, Biological, and Chemical) Defense, Oct 77 (app D, page D1)
- FM 21-41, Individual NBC Defense, Oct 77 (pages 25 thru 27)
- TEC Lesson 931-061-0060-F, NBC: The Mask
- TEC Lesson 931-061-0061-F, NBC: Masking and When To Do It



**TASK NUMBER: 092-503-1015**

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**PUT ON AND WEAR PROTECTIVE CLOTHING**

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**CONDITIONS:**

In a simulated NBC environment, given either the chemical protective overgarment or chemical protective liner ensemble, gloves and socks (boot socks and field gloves may be used), and a requirement to dress in protective clothing.

**STANDARDS:**

- ★ Complete dressing steps in 8 minutes IAW performance measures below.

**NOTE TO TRAINERS:** This task is designed to familiarize the soldier with the difficulty involved in performing his normal duties while wearing either protective garment. Time should be allowed for the soldier to remain in the protective clothing for a minimum of 6 hours.

**PERFORMANCE MEASURES:****1. Procedure for putting on overgarment.**

- a. Remove boots.
- b. Replace boot socks with impregnated socks.
- c. Put on boots and tuck trouser cuff in boot; lace tightly.
- d. Put on overgarment trousers and zip legs.
- ★ e. Put on overboots and lace tightly.
- f. Put on overgarment shirt; zip up and fasten closures.
- g. Put on protective gloves and pull the cuff of the overgarment over the gloves.

**2. Procedure for putting on liner ensemble.**

- a. Put on trouser liner.
- b. Put on outer trousers and attach liner waist tie tapes through belt loops of the outer trousers.
- c. Button inside gas flap button of trouser liner into right buttonhole, then button left outside of trouser liner to the same button.
- d. Put on protective socks and pull over top of the knitted cuff of the trouser liner.

★ **NOTE:** Material marked in this manner is different or not included in IIB and IIC series Soldier's Manuals.

e. Put on boots and lace snugly. The upper portion of the boot must cover the top of the knitted cuff of the trouser liner and top of the sock. The cuff of the outer trousers is bloused over the top of the boot.

f. Put on shirt liner. Button inside gas flap button into right buttonhole, then button left outside of liner to the same button.

g. Tuck the shirttail of the liner inside the trouser liner.

h. Put on the outer shirt. Button, and leave shirttail outside.

i. Put on protective gloves. Pull upper portion of glove over knitted cuff of shirt liner. Sleeves of outer shirt fit over the upper portion of the gloves.

**3. Perform primary duties wearing the protective clothing.**

**NOTE:** To remove either the overgarment or undergarment, follow steps in paragraphs 1 and 2 in reverse order. However, if your overgarment or field uniform and undergarment are contaminated, remove them according to paragraph 4.

**4. When garments are contaminated:**

a. Use the cloth bag from the M13 kit to detect/decontaminate liquid contamination.

b. Loosen the hood and remove the shirt.

c. Remove the trousers.

d. Dust the boots with the cloth bag and wash off with water.

e. Dispose of the contaminated clothing in a container or designated area.

f. Remove the mask and hood (if required, decontamination is done by an assistant prior to removal).

g. Remove the gloves.

**REFERENCES:**

**FM 21-40, NBC (Nuclear, Biological, and Chemical) Defense, Oct 77 (app B, pages B-1 thru B-3)**

**TM 10-277, Protective Clothing Chemical Operations, Jul 67, C1-3, (chap 12, sec III, para 12)**

**TASK NUMBER: 092-503-1007**

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**DECONTAMINATE SELF**

---

**★ CONDITIONS:**

Given all standard NBC protective equipment, the M13 and M258 decontamination kits or the M58 training skin decontamination kit, and an unknown liquid contaminant on the skin. (Contamination normally would result from exposure to a direct chemical attack or passage through a chemically contaminated area or as a result of radiological fallout).

**STANDARDS:**

Remove all contamination from the skin IAW the performance measures below.

**PERFORMANCE MEASURES:**

1. If you are not already masked, mask according to task: **Put on and wear a protective mask.**

2. For contamination on your face:

a. Extract the M13 kit (figure 1) from your protective mask carrier.

b. Take the fuller's earth pad (skin pad) from the M13 kit.

★ c. Grasp the chin portion of your mask, hold your breath, close your eyes, and pull the mask away from your face far enough to allow you to touch the fuller's earth pad to your nose.

d. Make two quick wipes from your nose to each ear and one wipe across the chin.

e. Replace the mask on your face.

f. Clear your mask.

★ g. Check your mask for leaks.

h. Dispose of the pad.

i. Put on all protective clothing not already on.

3. For contamination on skin other than the face:

a. Grasp your M258 kit (figure 2) carried on the belt of your protective mask carrier.

★ **NOTE: Material marked in the manner is different or not included in IIB and IIC series Soldier's Manuals.**

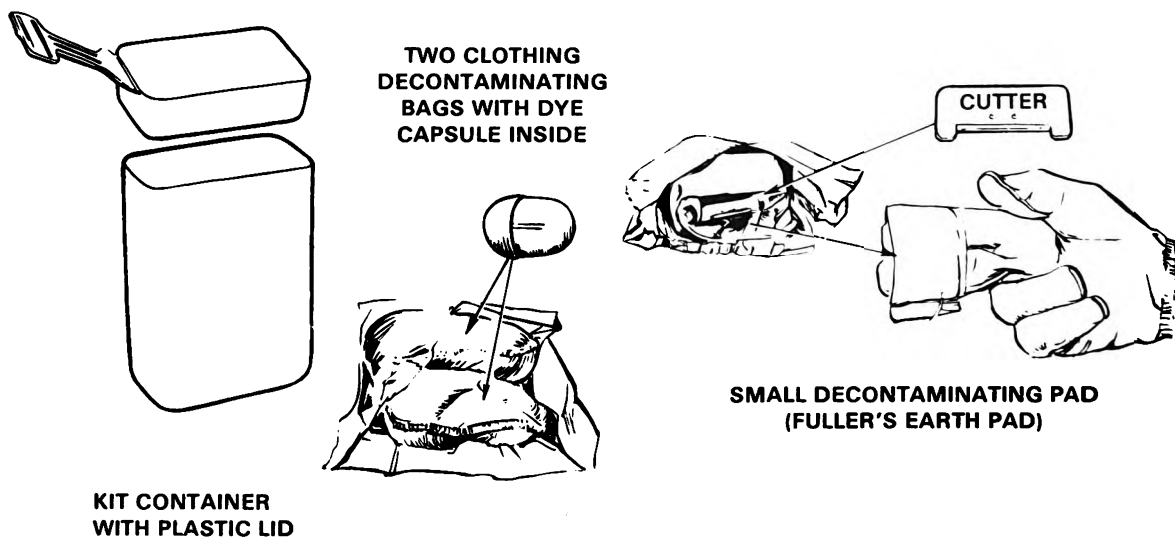


Figure 1. M13 decontamination kit.

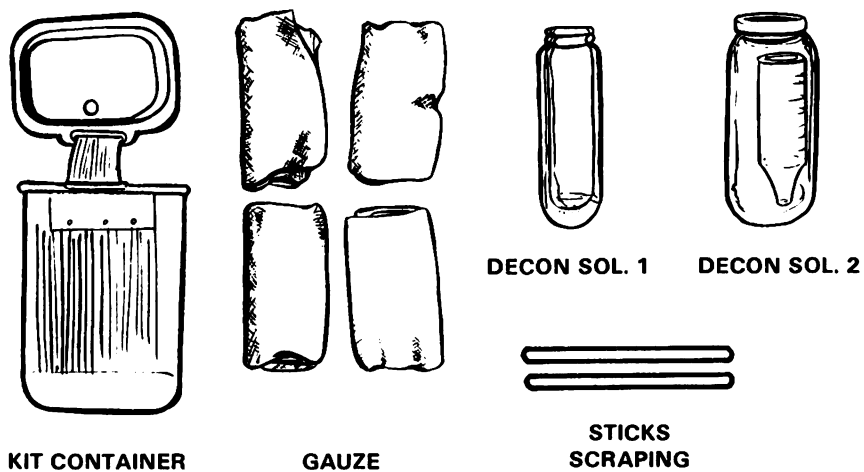


Figure 2. M258 decontamination kit.

- ★ b. Open the kit (figure 3).

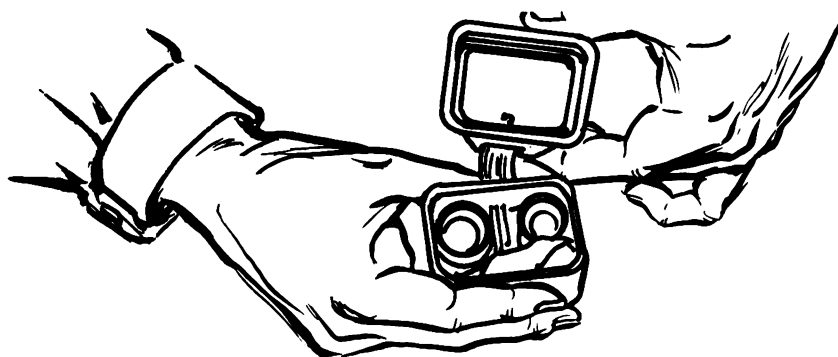
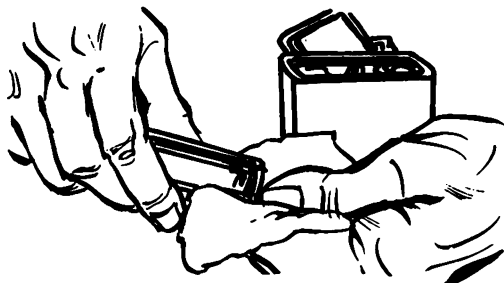


Figure 3.

★ c. Take out a gauze pad and soak up any liquid on your skin. **DO NOT WIPE.** If the liquid is thick and won't soak into the gauze, use one of the scraping sticks like a spoon and remove it. (Dispose of pad and stick.)

d. Take out Capsule 1 and punch a hole in the side near the bottom of the capsule with the spike attached to the cover of the kit.

★ e. Wet another gauze pad (figure 4) with the solution from the capsule and blot (figure 5) the contaminated skin for 1 minute.



*Figure 4.*



*Figure 5.*

f. Dispose of the pad.

g. Take out Capsule 2 and break the glass vial inside the capsule (figure 6). (Use the heel of your boot, the butt of your rifle, or a rock.)



*Figure 6.*

h. Shake the capsule hard at least 12 times so that everything is well mixed.

i. Puncture Capsule 2 the same way you did Capsule 1.

j. Wet another gauze pad with the solution from the capsule and blot the contaminated area with the solution for 2 to 3 minutes; make sure you cover the entire contaminated area.

k. Dispose of the pad.

l. Put on all protective clothing not already on.

★ **NOTE:** Items used from either kit for decontamination (pads, bags, and scraping sticks) should be treated as contaminated and buried.

4. For radiological contamination.
  - a. Shake clothing and equipment.
  - b. Brush off particles.
  - c. If in a defensive position, scrape the top layer of dirt away from your immediate area.
  - d. Take a shower as soon as the situation permits.

**SQT ADMINISTRATIVE INSTRUCTIONS:** The M58 training kit will be used in all training situations. The M258 kit will be used only for actual chemical agents.

**REFERENCES:**

**FM 3-87, NBC Reconnaissance and Decontamination (TBP)**

**FM 21-41, Individual NBC Defense, Oct 77 (pages 58-64)**



## TASK NUMBER: 092-503-1008

## DECONTAMINATE INDIVIDUAL EQUIPMENT

## CONDITIONS:

After being exposed to a chemical-agent attack, passing through an area contaminated with an agent, or operating in an area contaminated with a chemical agent, wearing all chemical protective clothing and given an M13 individual decontaminating and reimpregnating kit.

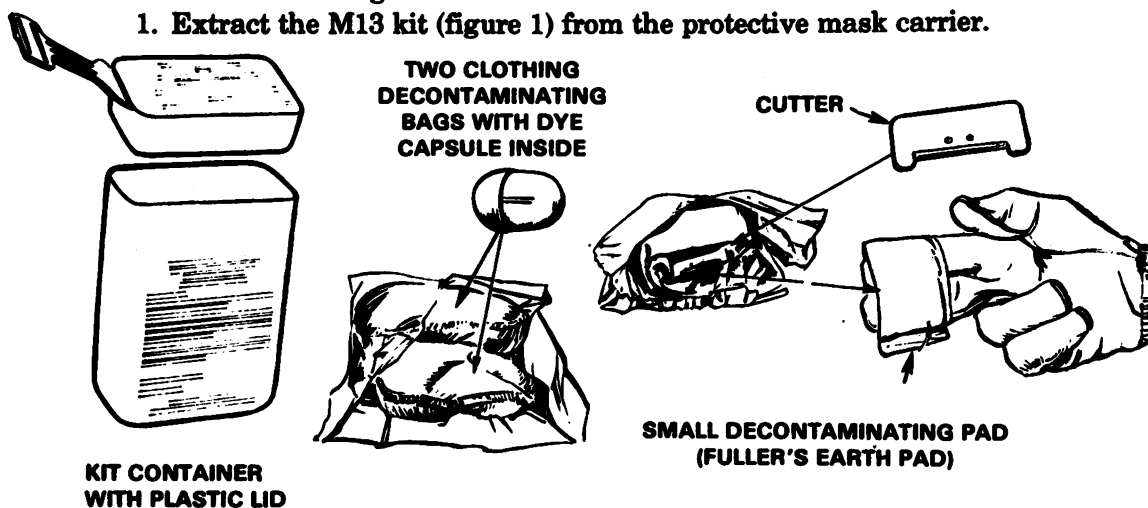
## STANDARDS:

- ★ Perform decontamination IAW performance measures below so that equipment can be used without causing the soldier to become a casualty.

## PERFORMANCE MEASURES:

To remove radiological contamination:

1. Extract the M13 kit (figure 1) from the protective mask carrier.



*Figure 1. M13 decontamination kit.*

2. Remove the fuller's earth pad and, if required, decontaminate the interior surface of your protective mask:
  - a. Blot the contamination with one side of the pad.
  - b. Turn the pad over.
  - c. Slap the pad against the mask to spread the powder.
  - d. Rub the powder in using the pad.

★ **NOTE:** Material marked in this manner is different in IIB and IIC series Soldier's Manuals.

3. Remove the cloth bag and use it to decontaminate the exterior of the mask, clothing, and individual equipment:

a. Crush dye capsule and mix thoroughly inside the bag.

**NOTE: Do not crush the dye capsule unless actual contamination is present.**

b. Dust the contaminated area.

c. Inspect for red or brown color on clothing.

d. If red or brown color is present, use the cutter to remove spots larger than one-eighth inch.

**NOTE: This does not apply to the overgarment which has an inner liner of charcoal to neutralize the contamination.**

e. On equipment, rub the powder in using the bag.

f. Clean and oil metal equipment as soon as possible.

★ To remove radiological contamination:

1. Brush, wipe, and/or shake contamination off the equipment.

2. Wash your equipment with hot, soapy water (remember to oil metal parts when you finish).

**SQT ADMINISTRATIVE INSTRUCTIONS:** That portion of the procedure which requires crushing of the dye capsule will be simulated. Only in the event of an actual chemical contamination will the capsule be crushed.

#### **REFERENCES:**

**FM 3-87, NBC Reconnaissance and Decontamination (TBP)**

**FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77 (app B, pages B7 and B9)**

**FM 21-41, Individual NBC Defense, Oct 77 (pages 65 & 66)**

**TASK NUMBER: 092-503-1014**

---

**IDENTIFY A CHEMICAL AGENT USING  
ABC-M8 DETECTOR PAPER**

---

**CONDITIONS:**

In a field or garrison environment, masked and wearing all individual combat equipment, given an unknown liquid chemical agent simulant and sufficient ABC-M8 detector paper.

**NOTE TO TRAINER:** Contact the NBC NCO at battalion level for suitable agent simulants.

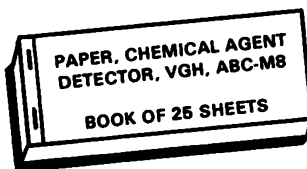
**STANDARDS:**

Within 1 minute, determine if the chemical agent is nerve (V or G) or blister (H).

**PERFORMANCE MEASURES:**

1. M8 detector paper gives the individual soldier the means for determining the presence of nerve or blister (H-type only) agents. M8 detector paper alone does not allow the soldier to determine if he can unmask. It will only detect nerve and blister agents in liquid form and must physically come in contact with them. M8 detector paper is normally found in the protective mask carrier.

M8 DETECTOR PAPER



2. To use M8 paper:
  - a. Remove the book of detector paper from the wrapping.
  - b. Tear out one sheet of paper.
  - c. Touch the paper to the suspected agent (unknown liquid).
  - d. Try to match the color reaction on the paper to the color chart on the inside cover of the book.
3. Inform your supervisor of your findings. Continue to wear your mask even if you don't get a match as this is no indication that the substance is necessarily safe.

**REFERENCE:**

FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77  
(app B, page B-11)



## TASK NUMBER: 092-503-1006

---

**GIVE VISUAL, VOCAL, AND SOUND  
ALARMS FOR A CHEMICAL OR BIOLOGICAL ATTACK**

---

**CONDITIONS:**

In a field environment, masked and wearing all individual combat equipment, given a requirement to give the alarm for a surprise chemical or biological attack.

**STANDARDS:**

Demonstrate the correct arm-and-hand signal, vocal signal, and sound alarm in accordance with performance measures below.

**PERFORMANCE MEASURES:**

1. **Visual Signal** (figure 1). Extend both arms horizontally sideways with fists doubled facing up, and rapidly move the fists to the head and back to the horizontal position. Repeat at least three times.



*Figure 1.*

2. **Vocal Signal.** Yell "Spray!" for a chemical or biological spray attack and "Gas!" for an attack by any other means.

3. **Sound Alarm.**

- a. Rapidly strike metal on metal to produce a loud clanging noise.
- b. Soldiers should become familiar with the sound alarm given off by the automatic chemical agent alarm. This sound is very similar to a police siren.

**NOTE TO TRAINERS:** It is recommended that this task be trained in conjunction with unit NBC training on field exercises.

**REFERENCES:**

FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77  
(chap 6, page 6-7)

FM 21-60, Visual Signals, Dec 74 (chap 2, page 2-1)



## TASK NUMBER: 092-503-1009

---

**SATISFY PERSONAL NEEDS IN A  
CHEMICAL ENVIRONMENT**

---

**CONDITIONS:**

In an area contaminated with an unknown chemical agent (simulated), masked and wearing standard chemical protective clothing (or acceptable substitute) and all individual combat equipment, given the need to drink water, use the latrine, and sleep.\*

**\*NOTE: Other personal needs such as eating, shaving, bathing, and changing clothes in a chemical environment require equipment and efforts beyond the capabilities of an individual. Your unit will tell you how to deal with these problems.**

**STANDARDS:**

1. Drink water from your canteen IAW performance measures below.
2. Explain correct procedure for using the latrine and sleeping.
- ★ 3. Satisfy needs without becoming a casualty.

**PERFORMANCE MEASURES:**

1. Drinking with mask other than the M17A1.
  - a. Remove the canteen from the carrier, remove the canteen cap and, if necessary, decontaminate exposed threads with water or the skin pad from the M13 decontaminating kit.
  - b. Take a few breaths and hold the last one.
  - c. Close the eyes, pull the protective hood up, grasp facepiece behind the outlet valve assembly of the protective mask with the free hand, and pull the facepiece out and up far enough to provide access to the mouth.
  - d. Place the neck of the canteen to the closed lips and cant it, tilting the head back until the water reaches the lips, and then fill the mouth with water.
  - e. Replace the facepiece, swallow the water, and then clear the mask.
  - f. Rest and then repeat as necessary.
2. Drinking when wearing the M17A1 mask (figure 1).

★ **NOTE: Material marked in this manner is different or not included in 11B and 11C series Soldier's Manuals.**

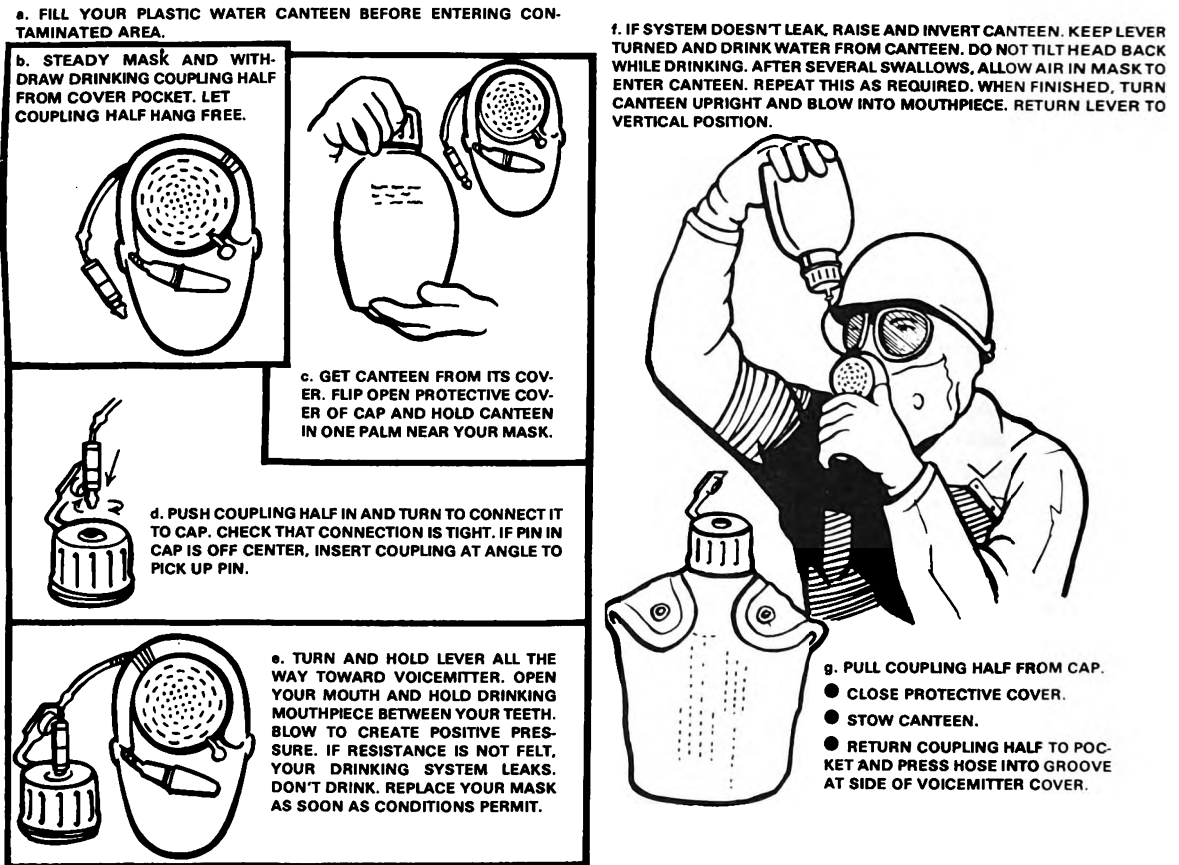


Figure 1.

3. Using the latrine. During the removal, opening, and closing of contaminated outer garments or while squatting over the latrine in a contaminated environment, the possibility of transferring contamination to the underclothing or exposed skin requires special precautions. For this reason, individuals dust with the cloth pad of the M13 decontamination kit the parts of the contaminated outer garments that might come in contact with the skin when the contaminated clothing is partially removed or opened. After the contaminated outer garments have been opened or partially removed, individuals remove the protective gloves before handling undergarments or the bare skin.

#### 4. Sleeping.

- Wear all protective clothing, mask, and hood.
- Use the "buddy" system to periodically check to insure the clothing, mask, and hood do not become dislodged while sleeping.

#### REFERENCES:

FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77 (chap 5, pages 5-7 and 5-8)

TM 3-4240-279-10, Operator's Manual, ABC M17/M17A1, C1, Aug 75 (chap 2, pages 2-13 thru 2-14)



**TASK NUMBER: 092-503-1005**

---

**PROTECT SELF AGAINST  
A NUCLEAR HAZARD**

---

**★ CONDITIONS:**

In a field or garrison location, wearing all individual combat gear, given a sudden nuclear explosion (simulated) without warning or a warning that a nuclear attack is imminent.

**STANDARDS:**

Protect yourself IAW performance measures listed below.

**PERFORMANCE MEASURES:****1. When subjected to an unexpected nuclear attack:**

a. Close your eyes and fall face down to the ground immediately, your head in the direction opposite the blast.

b. As you hit the ground, cover all exposed skin. Place your hands under your body, keep your face down in the dirt, and hunch your shoulders forward to try to cover the back of your neck. Be sure to keep your helmet on.

c. Remain down until the blast wave passes over you, first in one direction and then in the opposite direction, and until debris stops falling.

d. Stay calm, check for injury, check weapons and equipment damage, and prepare to continue the mission.

2. The important thing to remember in an unexpected nuclear attack is to take cover immediately. That means if you have a choice between falling directly on the ground or taking two steps and jumping into a ditch, you must fall directly on the ground. In the time it takes to go those two extra steps, you can sustain serious injury.

3. When warned of an imminent nuclear attack, place yourself in the best protective position possible (figure 1).

★ a. Remain in the shelter until the blast wave passes over you and debris stops falling.

★ b. Check for injury and damage to weapons and equipment.

★ **NOTE: Material marked in this manner is different or not included in the IIB and IIC series Soldier's Manuals.**

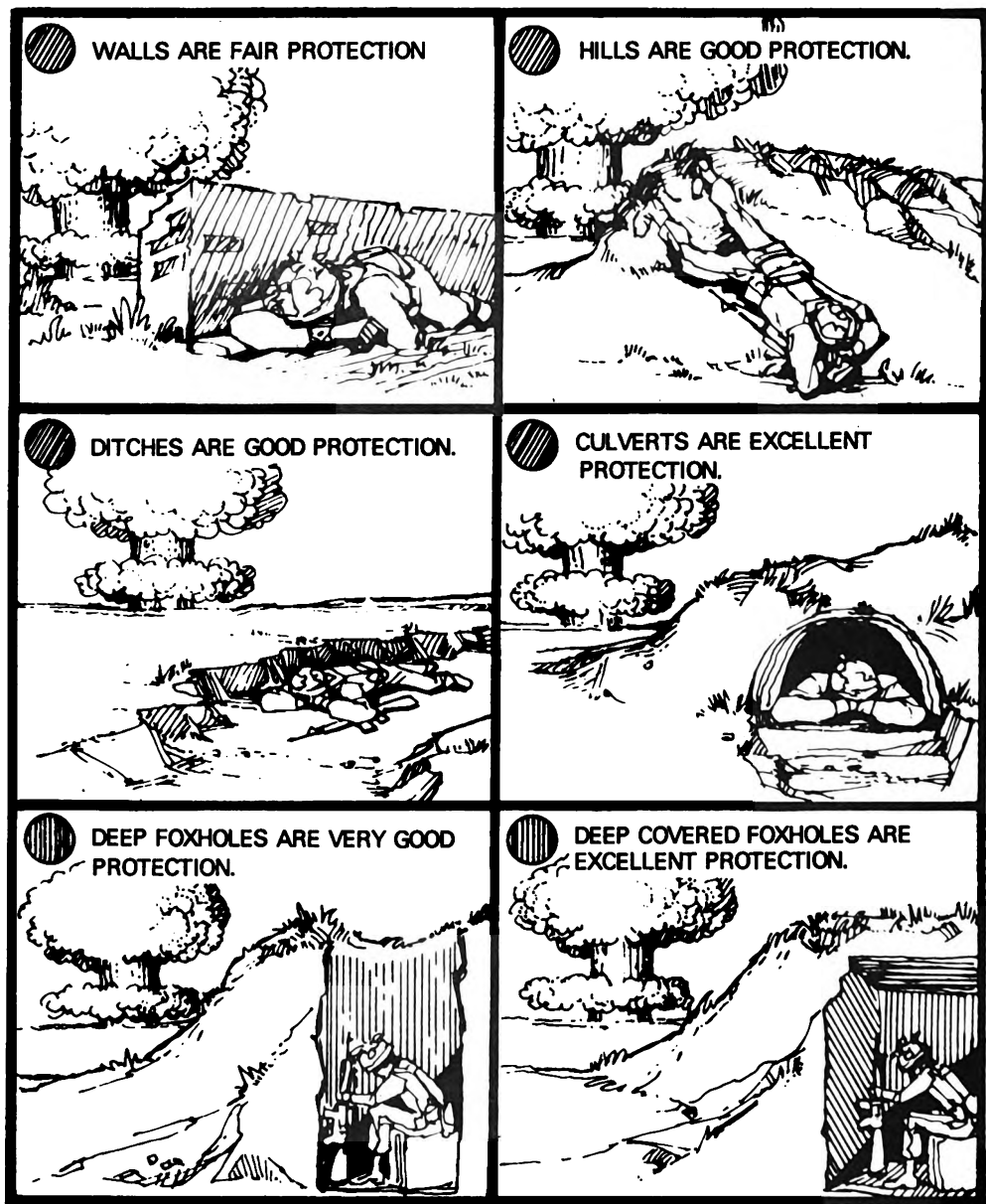


Figure 1.

**NOTE:** An armored vehicle is excellent protection.

**REFERENCES:**

FM 21-40, NBC (Nuclear, Biological, and Chemical) Defense, Oct 77 (chap 1, page 1-5 thru 1-8; chap 3, page 3-1 thru 3-3)

TEC Lesson 931-061-0064-F, Individual Protection and Decontamination

**TASK NUMBER: 081-831-1012**

---

**ADMINISTER ANTIDOTE TO A  
NERVE-AGENT CASUALTY**

---

**CONDITIONS:**

While wearing a protective mask, given two nerve agent antidote injectors (combo pen) and a casualty with nerve-agent symptoms (described or simulated) (casualty may be tested soldier) and carrying the protective mask carrier in an authorized carry position.

**STANDARDS:**

Within 30 seconds, recognize nerve-agent symptoms, inject casualty (self) twice with antidote (simulated), and massage injection area.

**PERFORMANCE MEASURES:**

1. How to recognize nerve agent symptoms. These symptoms may appear in an individual who was well and gets sick within a very few minutes:

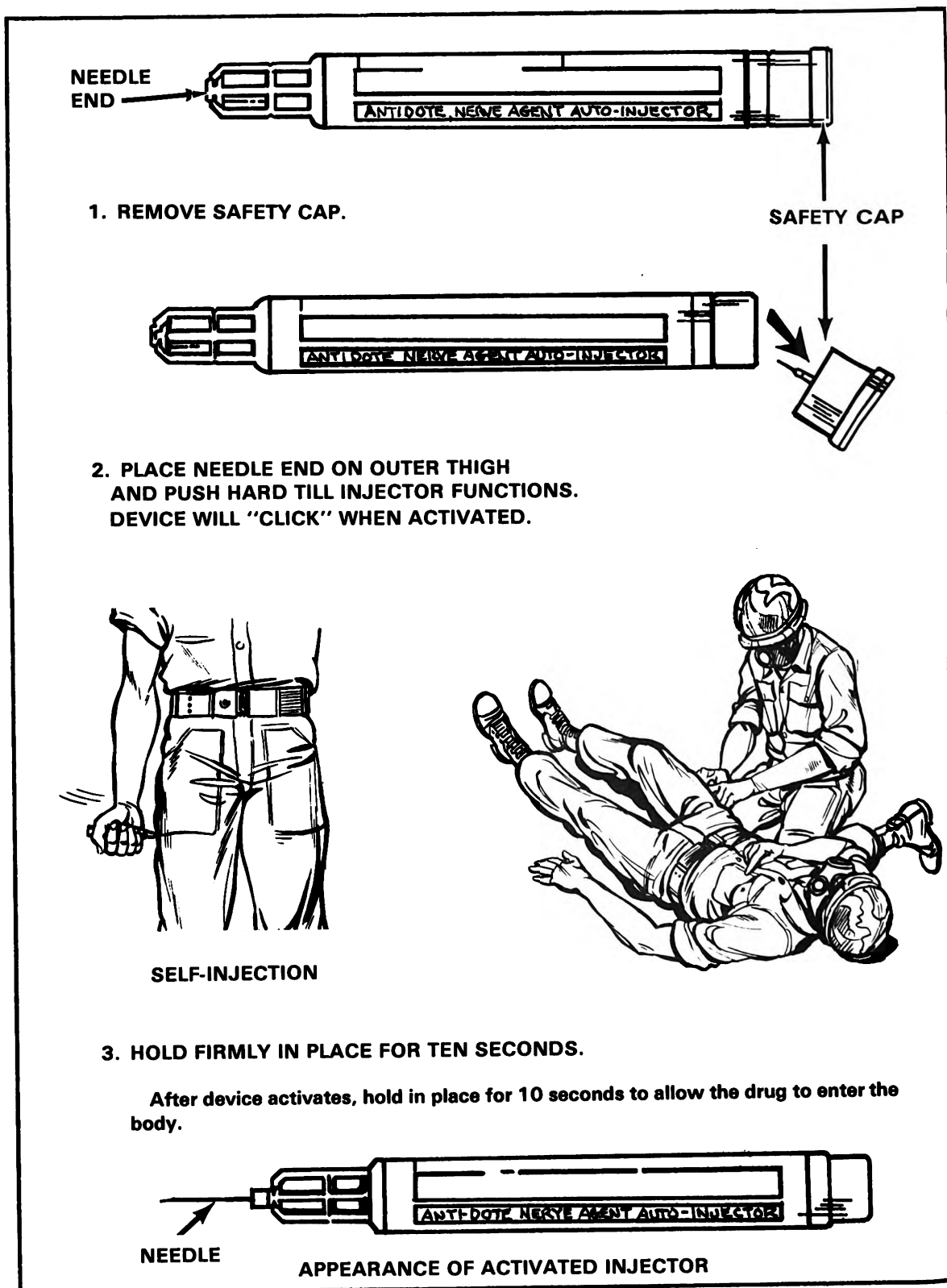
- a. Difficulty in breathing with tightness in chest.
- b. Pinpointing of eye pupils (tested soldier would recognize this as dimness of vision).
- c. Excessive running nose.
- d. Excessive saliva and drooling.
- e. Jerking and twitching muscles, staggering.
- f. Headache, dizziness.
- g. Nausea, cramps.

2. Mask the casualty if not already masked.

★ 3. How to administer the nerve agent antidote. (figure 1).

- a. Remove two combo pens from the casualty's mask carrier.

★ **NOTE:** Some material contained in paragraph 3 doesn't agree with the referenced manuals. The material will be included on the next update of referenced manuals. Also this material is not included in the IIB and IIC series Soldier's Manuals.



*Figure 1. Procedures for administering antidote nerve agent auto-injector.*

b. Remove safety cap from one combo pen; place needle (black) end against injured soldier's outer thigh, press hard and hold for ten seconds (figure 1). Remove combo pen.

c. Remove the safety cap from the second combo pen; place needle (black) end against injured soldier's outer thigh, a couple of inches from the first injection, press hard and hold for ten seconds. Remove combo pen.

d. Massage the injection sites for 10-15 seconds.

e. Stick the injector needles through injured soldier's shirt collar or pocket and bend the needle to secure the pen to clothing.

4. If injured soldier stops breathing, give artificial respiration.

5. If required, decontaminate the injured soldier, his clothing, and his equipment (see tasks 092-503-1007 and 092-503-1008).

6. After giving injections, seek medical help for the injured soldier. DO NOT give more than two combo pens.

#### **REFERENCES:**

**FM 21-11, First Aid for Soldiers, Jun 76 (chap 11, page 129)**

**FM 21-41, Individual Defense, NBC, Oct 77 (pages 12 through 15, 32 & 33)**



## TASK NUMBER: 081-831-1017

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**ADMINISTER FIRST AID TO BLOOD-AGENT CASUALTY**

---

**CONDITIONS:**

In a simulated NBC environment, wearing all individual equipment, gloves, and mask, given at least two simulated amyl nitrite capsules and a casualty showing symptoms of blood-agent poisoning.

**STANDARDS:**

Within 30 seconds, recognize blood-agent symptoms, and give first aid IAW performance measures below:

**PERFORMANCE MEASURES:**

- ★ 1. How to recognize blood-agent poisoning:
  - a. Marked increase or decrease in breathing rate (labored).
  - b. Convulsions or coma.
  - c. Dizziness, headaches, irritated eyes and nose, red or purple under the fingernails.
- 2. Mask the casualty.
- 3. Remove the box of amyl nitrite ampuls from the casualty's mask carrier.
  - a. Crush two ampuls.
  - b. Open the seal of the casualty's mask at the temple strap, and quickly put the crushed ampuls inside the protective mask in the eyelens area.
- 4. Repeat **step 3** every 4 minutes until normal breathing returns, or a total of eight amyl nitrite capsules is used.
- 5. If casualty cannot be masked for some reason, hold amyl nitrite capsule directly under casualty's nose. Be sure to use the casualty's amyl nitrite capsule and not your own.

★ **NOTE: Material marked in this manner is different or not included in the IIB and IIC series Soldier's Manuals.**

- ★ **6. Administer artificial respiration as necessary.**
  - a. For a casualty who cannot be masked, use the back-pressure armlift method.**
  - b. For a masked casualty, use the mask-to-mouth resuscitation method.**
- 7. Get soldier to medical help if possible, and notify your supervisor.**
- 8. Prepare to continue the mission.**

**REFERENCES:**

**FM 21-11, First Aid for Soldiers, Jun 76 (chap 11, page 135)**  
**FM 21-41, Individual NBC Defense, Oct 77 (page 35)**  
**TEC Lesson 931-061-0062-F, NBC: First Aid, Part 1**



## TASK NUMBER: 081-831-1015

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**GIVE BACK-PRESSURE ARMLIFT ARTIFICIAL  
RESUSCITATION TO A CHEMICAL-AGENT CASUALTY**

---

**CONDITIONS:**

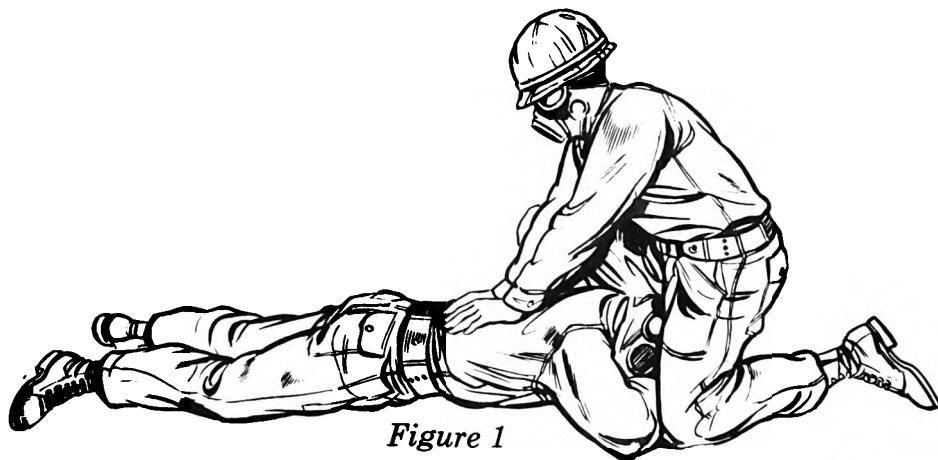
Given an unconscious soldier in a contaminated area who is not breathing and who cannot be given mask-to-mouth resuscitation (soldier with a facial injury) or a masked soldier who is being given first aid for blood-agent poisoning.

**STANDARDS:**

Clear the airway and give artificial resuscitation IAW the performance measures.

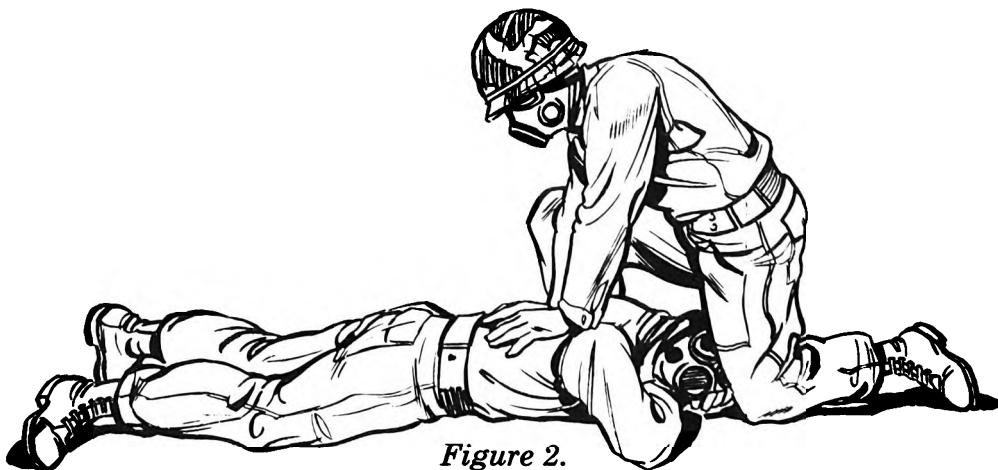
**PERFORMANCE MEASURES:**

1. Shake the soldier's shoulder and shout, "Are you O.K.?" If the soldier answers, resuscitation is not needed.
2. If soldier does not answer, call for help and assistance.
3. Kneel at injured soldier's head. If in a contaminated area, kneel on a poncho or other material to avoid ground contamination.
4. Check to determine if he is breathing by watching the rise and fall of his chest.
5. If he is not breathing, put soldier on his stomach with his face to one side, neck extended, and hands under his head (figure 1).
6. Clear upper airway.
  - a. Clear airway by removing any false teeth, dirt, vomit, mucus, or other material in the soldier's mouth. Use fingers wrapped with any noncontaminated cloth to clean the airway.
  - b. If casualty is masked, lift the mask below the chin, clear the airway, remove debris from the mask, and reseal the mask.
7. Start resuscitation.
  - a. Kneel at soldier's head (figure 1). Put your hands on his back, fingers extended, just below his shoulder blades.



*Figure 1*

b. Rock forward, keeping your arms straight, and push straight down on soldier's back (figure 2).



*Figure 2.*

c. Rock back, and grab his arms just above the elbow (figure 3).



*Figure 3.*

d. Pull the soldier's arms toward his head until you feel resistance (figure 4).



*Figure 4.*

e. Repeat steps b, c, and d at the rate of one complete cycle every 5 or 6 seconds.

**8. Stop resuscitation.**

a. Stop artificial respiration when the soldier begins to breathe on his own. Watch him to insure that he does not stop breathing.

b. If soldier fails to start breathing, continue resuscitation until he breathes on his own, until you are relieved by medically trained personnel, or until you are too exhausted to continue.

**REFERENCES:**

None.



TASK NUMBER: 081-831-1014

---

**APPLY MASK-TO-MOUTH RESUSCITATION TO A  
CHEMICAL-AGENT CASUALTY**

---

**CONDITIONS:**

Given a soldier who is unconscious and not breathing but who still has a pulse (heartbeat). The soldier has been exposed to a chemical agent and is in a contaminated area. You are wearing a protective mask and you have an M1 resuscitation tube; the casualty may or may not be masked.

**STANDARDS:**

Complete the steps in the performance measures, performing mask-to-mouth resuscitation without error.

**PERFORMANCE MEASURES:****1. Prepare your mask (figure 1):**

- a. Turn the valve handle at the voicemitter to the left position.
- b. Place and hold the breathing tube bite-piece between your teeth.

**NOTE: The bite-piece will spring back to the neutral position if you release your bite.**

- c. Lift up the voicemitter cover and insert the air outlet valve of the M1 resuscitation tube into the well of the air outlet under the voicemitter cover.

**NOTE: To get a tight, leakproof seal, first insert the unflanged edge of the air outlet valve with an upward push, and then press the flanged edge inward, toward you.**

- d. Check for leakproof seal. Fold back and pinch the lower end (mouthpiece) of the M1 resuscitation tube. Now blow into your breathing tube bite-piece.

**NOTE: If you have a leakproof seal, the M1 resuscitation tube will expand. If it does not, remove the air outlet valve from your mask and start all over. You must have a leakproof seal or you will blow contaminated air into the soldier's lungs.**

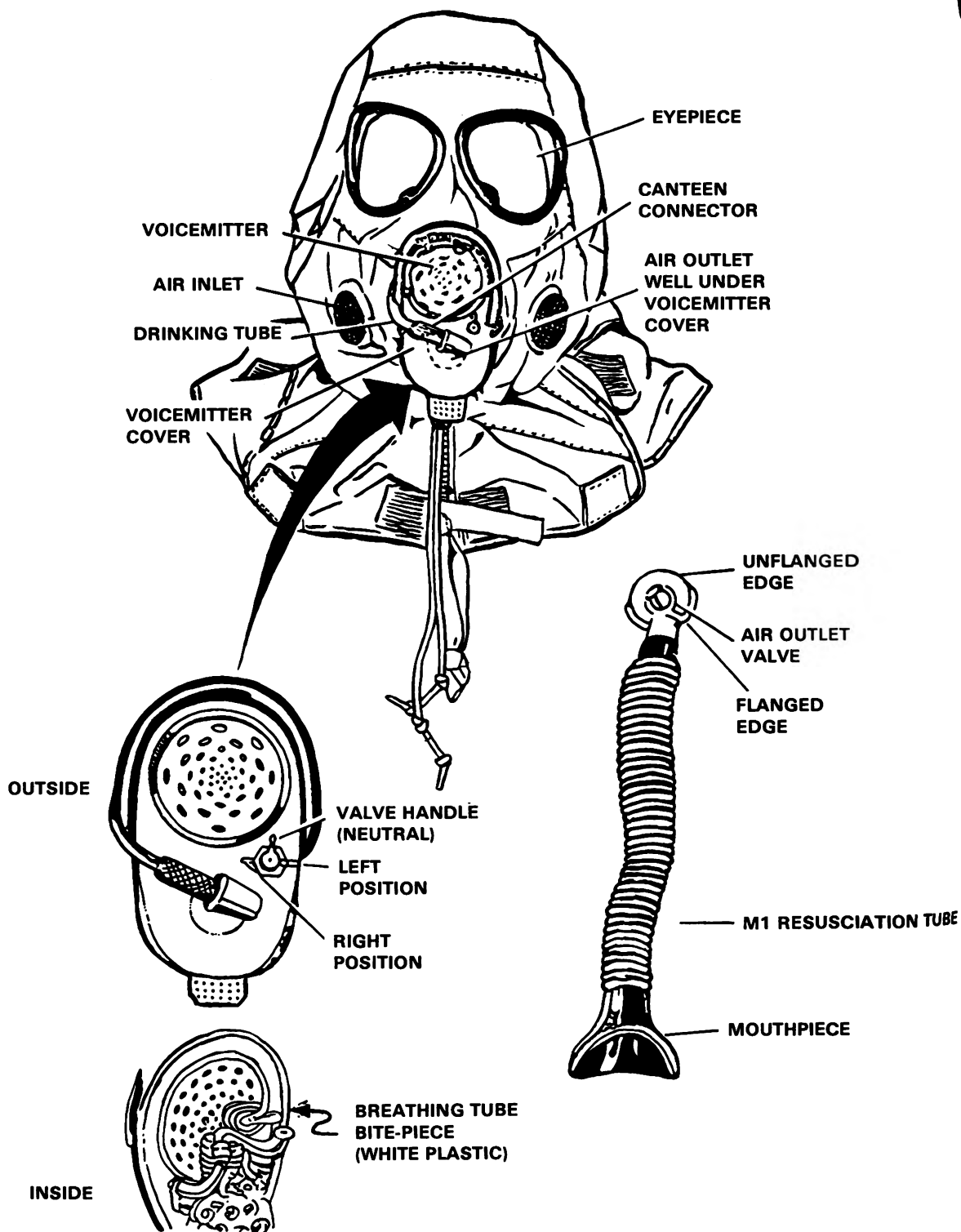
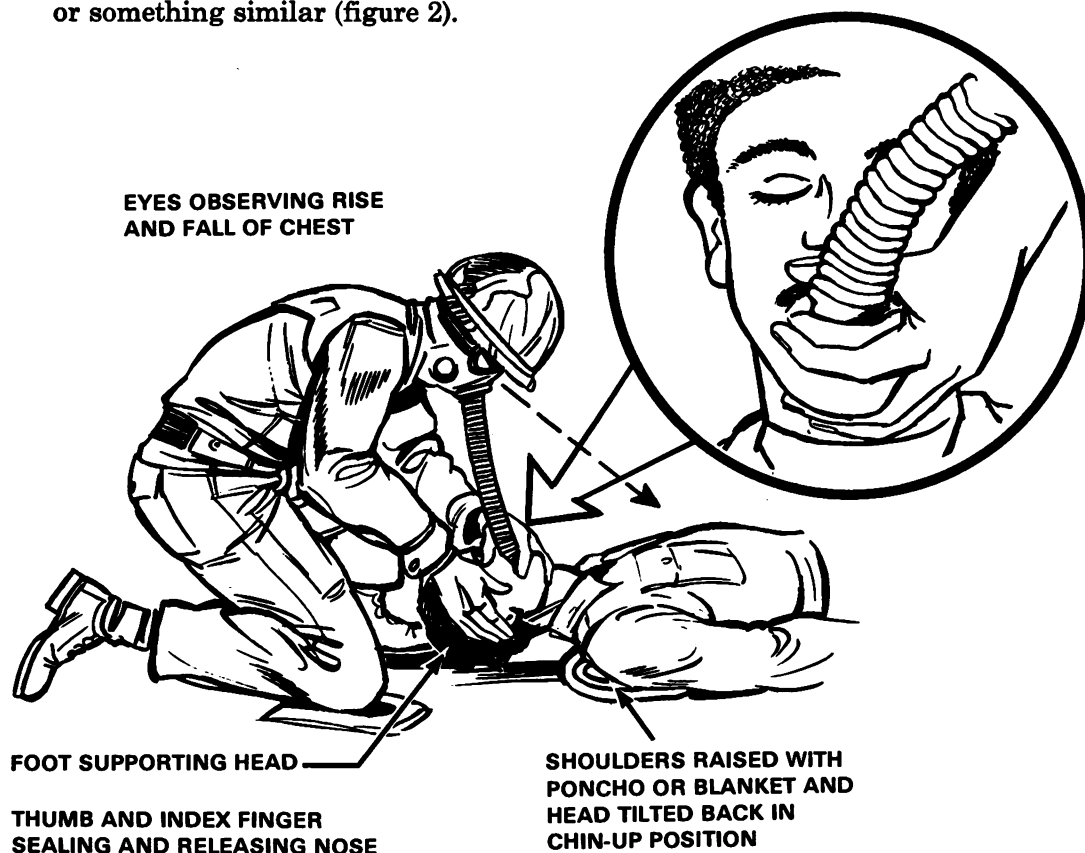


Figure 1. M17A1 field protective mask and M1 resuscitation tube.

2. Place soldier on his back, raising his shoulders with a poncho, blanket, or something similar (figure 2).



*Figure 2.*

3. Kneel at soldier's head on a blanket or other material so you will not contact the contaminated surface (figure 2).

4. Take off the soldier's mask (if masked) and place it on his chest.

5. Take any false teeth, dirt, or other material out of the soldier's mouth.

6. Tilt the soldier's head backward in a chin-up position.

7. Insert resuscitation tube.

a. Insert mouthpiece with indented portion under the soldier's upper lip between lips and teeth.

**NOTE: Make sure that edges of mouthpiece are completely covered by his lips.**

b. Seal the mouthpiece in place by placing your thumb and index finger over the soldier's lips (insert figure 2). Hook the other three fingers under his to keep his jaw up.

8. Pinch the soldier's nose closed with your free hand.
9. Blow four quick, forceful breaths into the soldier's mouth and see if his chest rises.

**NOTE: If chest does not rise, hold his chin up higher and blow harder. Make sure the edges of the mouthpiece are completely covered by the soldier's lips.**

10. Check for soldier's pulse.
11. If there is a pulse, continue breathing into the resuscitation tube once every 5 seconds. After each breath, release the nose, then close it again as soon as the soldier breathes out.

**NOTE: If soldier's breath is noisy, hold his chin up higher or clear the airway again.**

12. When soldier begins to breathe on his own, adjust your breathing to assist him by blowing into the resuscitation tube when he is breathing in, not when he is breathing out.
13. When soldier begins to breathe regularly, stop blowing but leave the tube in place. Continue to close his nose when he inhales and open it when he exhales.

**NOTE: Begin resuscitation if the soldier does not continue to breath regularly. Continue resuscitation as long as there is a pulse, until he begins to breathe on his own, until you are relieved by medically trained personnel, or until you are too exhausted to continue.**

14. When soldier can breathe without help, take the tube from his mouth and quickly put on his mask. If he is conscious, have him clear his mask and be sure it fits properly.
15. Watch the soldier to be sure he does not stop breathing again as the result of chemical agent that may have built up in his mask.
16. Adjust your mask.
  - a. Release the breathing tube bite-piece, allowing it to spring back to its neutral position.
  - b. Disconnect the tube from your mask. Pull the tube out and up, and replace the voicemitter cover.
  - c. Wipe the tube mouthpiece clean and stow it in the carrier.

## REFERENCES:

FM 21-11, First Aid for Soldiers, Jun 76 (pages 130-134, para 11-8d)



**TASK NUMBER: 092-503-1004**

---

**RECOGNIZE AND PROTECT SELF AGAINST A  
CHEMICAL/BIOLOGICAL (CB) HAZARD**

---

**CONDITIONS:**

In a field environment during the conduct of a tactical mission against (simulated) enemy forces which have a CB offensive capability, given you assigned weapon, TOE equipment, and protective mask with all accessories.

**STANDARDS:**

Respond to source or indicator of NBC attack by masking, sounding the alarm, and continuing the mission.

**PERFORMANCE MEASURES:**

1. Current analysis of threat doctrine indicates that threat forces have a powerful CB offensive capability and are prepared to use it. Its important, then, for the individual soldier to know what the possible sources and indicators of a CB attack are. He must learn to mask immediately when these sources or indicators become apparent to him, if he is to survive on the battlefield.

2. If an attack is reported to be imminent or if chemical agents have been used already by enemy forces, individuals not already masked will mask when:

a. Any artillery, mortar, rocket, or aircraft attack occurs on or near their position.

b. Any smoke, mist, vapor, or droplets of an unknown source occur in the area.

c. There is any reason for suspecting a chemical attack.

d. Any of the following symptoms appear:

(1) Running nose.

(2) Choking and/or tightness in the chest and throat.

(3) Dimming of vision or difficulty in focusing.

(4) Irritation of the eyes.

(5) Increase in breathing rate, or difficulty in breathing.

e. Entering an area known or suspected to be contaminated.

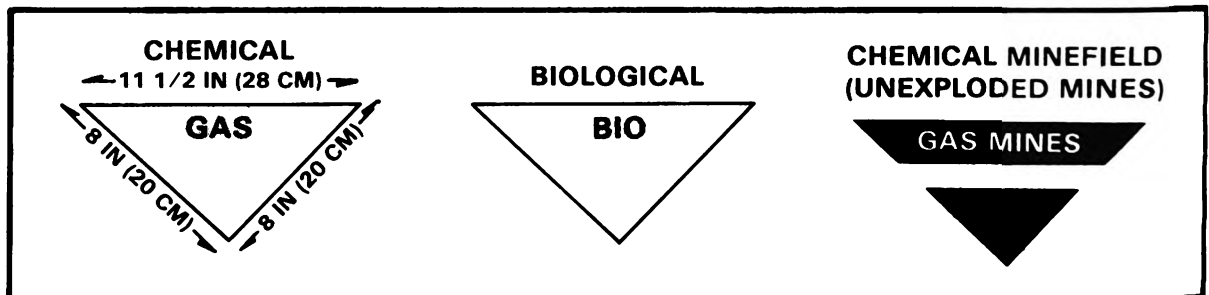
3. In some cases, you will encounter a contaminated area which has been marked. You should mask immediately. Standard NATO CB markers are pictured in figure 1.

a. The chemical marker has the word **GAS** in red against a yellow background.

b. The biological marker has the word **BIO** in red against a blue background.

c. The chemical minefield marker has the words **GAS MINES** and a horizontal strip in yellow on a red background.

**NOTE:** The front surface of the marker is facing away from the contaminated area and all information concerning the minefield is placed on the front surface of the marker, not the back.



*Figure 1.*

**REFERENCES:**

FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77  
(chap 1, pages 1-10 thru 1-18; chap 5, pages 5-2 and 5-3)  
FM 21-41, Individual NBC Defense, Oct 77 (page 7, 8, 13 and 17)

**SQT Administrative Instruction:** An on-target chemical agent attack can be simulated using the Simulator Projectile Airburst Liquid (SPAL) M9 or a spray of water combined with the detonation of artillery simulators.

## TASK NUMBER: 092-503-2002

## DECONTAMINATE EQUIPMENT USING ABC-M11 DECONTAMINATION APPARATUS

### ★ CONDITIONS:

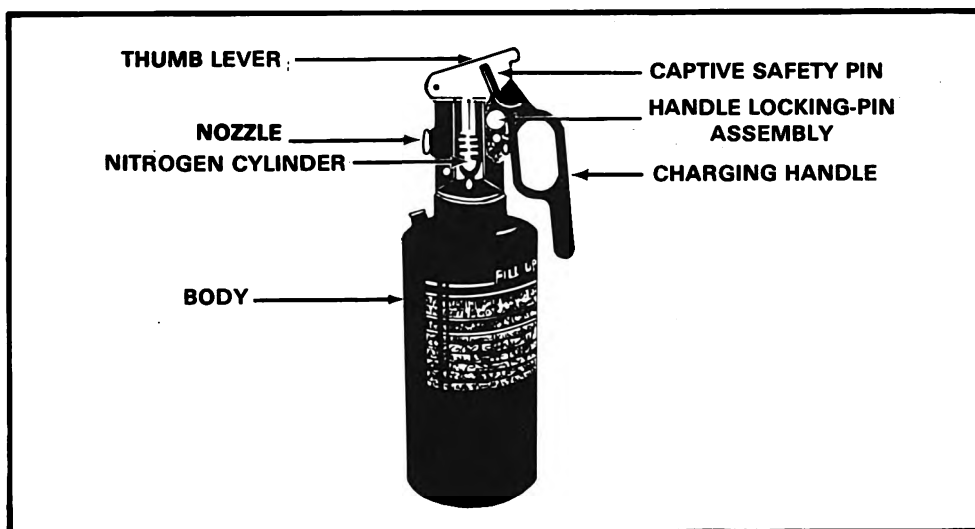
In a simulated NBC environment, while masked and wearing all individual combat equipment and gloves, given a prefilled ABC-M11 decontamination apparatus and directed to decontaminate the equipment.

### ★ STANDARDS:

Place the M11 decontamination apparatus into operation and decontaminate the equipment.

### PERFORMANCE MEASURES:

1. The M11 decontamination apparatus (figure 1) has a 1½-quart capacity and normally holds 1-1/3 quarts of DS2 decontamination solution. It is normally mounted in wheeled and tracked vehicles, to be used to decontaminate surfaces which must be handled to operate the vehicle or allow it to perform its mission (e.g., laterals, steering wheel, driver's seat, combat door, hatches, etc.).



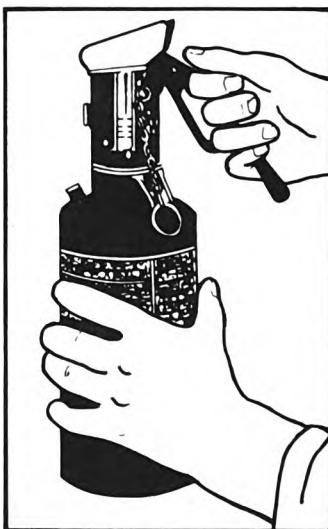
*Figure 1.*

★ NOTE: Material marked in this manner is different or not included in the IIB and IIC series Soldier's Manuals.

2. To operate a filled M11:

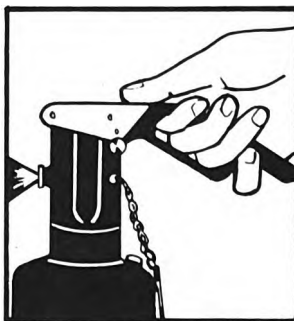
a. Remove the captive safety pin.

b. Grasp the M11 in one hand (figure 2) and lift up on the charging handle with the other. You should hear a hissing noise which indicates the compressed gas from the nitrogen cylinder has entered and charged the M11.



*Figure 2.*

c. Pull up on the charging handle, point the apparatus at the object to be decontaminated, hold it 6 to 8 inches away, and depress the thumb lever (figure 3).



*Figure 3.*

d. The charged M11 will last about 30 seconds, so care should be taken to prevent wasting the DS2.

e. Having sprayed the object to be decontaminated, interrupt the flow by removing your thumb from the thumb lever.

f. Depress the handle locking pin, lower the charging handle, and replace the captive safety pin.

**WARNING: DS2 is highly corrosive. DO NOT SPRAY ON PERSONNEL and avoid spraying fabric.**

3. To decontaminate a contaminated weapon.

a. Holding the charged and filled M11 6 to 8 inches from the weapon, depress the thumb lever and cover the weapon completely with the spray from the apparatus. Avoid getting spray on any surfaces that are not metal.

b. Wait 30 minutes (simulate).

c. Flush surfaces of weapon with water, taking care to avoid contact with the runoff.

d. Dry, clean, and lubricate weapon.

**NOTE TO TRAINERS: Fill the M11 with water instead of DS2 for training purposes. When task is complete, thoroughly dry the M11 to prevent rusting, and heavily oil weapons, if used, to prevent rusting.**

#### **REFERENCES:**

**FM 21-40, NBC (Nuclear, Biological and Chemical) Defense, Oct 77 (chap 5, pages 5-27 and 5-28)**

**TM 3-4230-204-12 & P, Decontaminating Apparatus, Portable, DS2, 1½ Quart, ABC-M11**



**TASK NUMBER: 092-503-2007****IGNITE SMOKE POTS****CONDITIONS:**

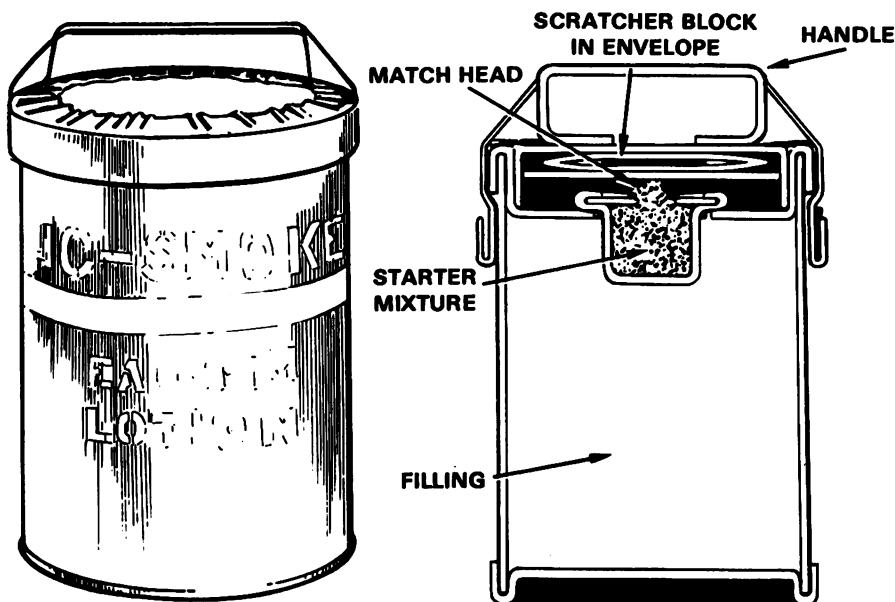
In a (simulated) combat environment given an M1 or M5 smoke pot and a requirement to conceal your position.

**STANDARDS:**

Ignite the M1 or M5 smoke pot.

**PERFORMANCE MEASURES:**

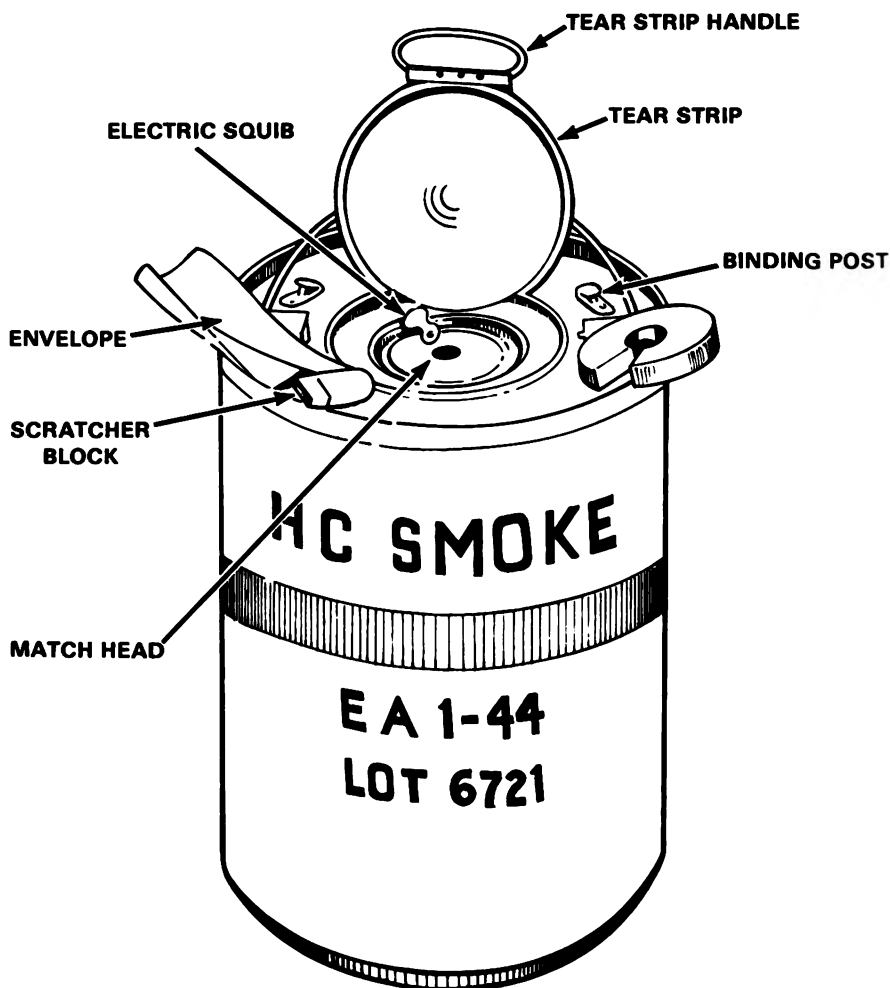
1. To ignite the M1 pot (figure 1).
  - a. Strip off the adhesive tape and clamp.
  - b. Remove outer cover to expose match head.
  - c. Remove scratcher block from envelope.
  - d. While looking away from the pot, draw the scratcher block rapidly across the match head.
  - ★ e. Move away from the smoke pot and insure the smoke is covering the position.



*Figure 1. M1 10-lb. HC smoke pot.*

2-I-B-17.1

2. To ignite the M5 pot (figure 2).
  - a. Expose the match head by pulling the tear strip handle upward and off.
  - b. Remove scratcher block from envelope.
  - c. While looking away from the pot, draw the scratcher block rapidly across the match head.
  - ★ d. Move away from the smoke pot and insure the smoke is covering the position.



*Figure 2. ABC-M5 smoke pot prepared for manual ignition.*

★ **NOTE:** Material marked in this manner is different or not included in 11B and 11C series Soldier's Manuals.

#### REFERENCE:

TB CML 100, Smoke Pot, HC, 10-lb, M1 and 30-lb, ABC-M5; Smoke Pot, Floating, HC, M4A2; SGF2, AN-M7 and SGF2, AN-M7A1, C1, Apr 64 (para 8-b(1); 9b(1))



**TASK NUMBER: 092-503-2001****READ AND REPORT RADIATION DOSAGES****CONDITIONS:**

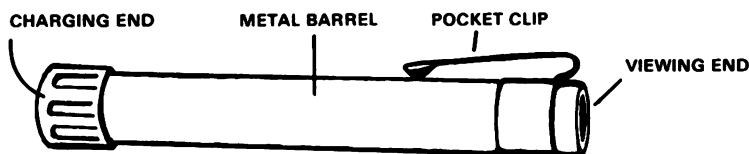
In a nuclear environment (simulated) while masked and wearing all individual combat equipment, given an IM93/UD series pocket dosimeter with a preset radiation dosage.

**STANDARDS:**

Read and report the correct radiation dosage within 20 rads.

**PERFORMANCE MEASURES:**

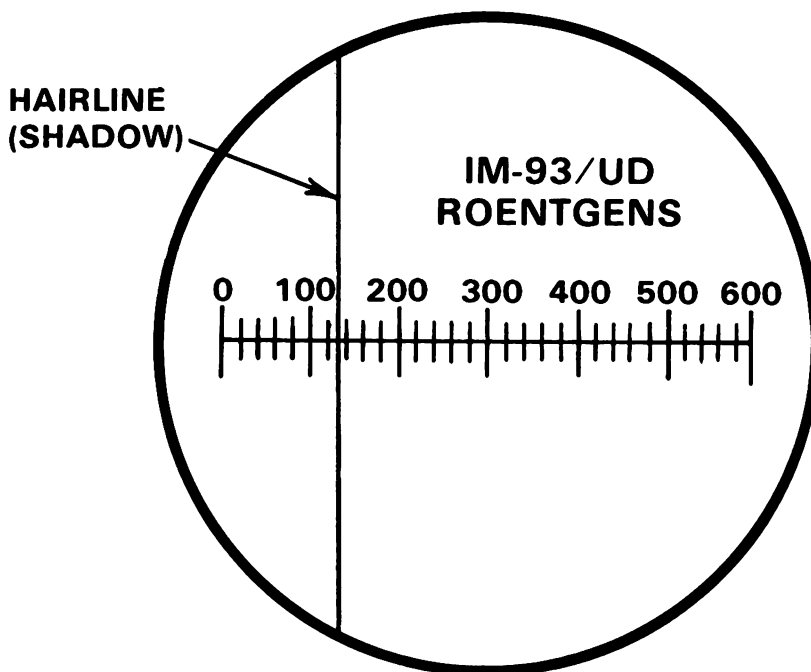
1. The IM93/UD and IM93A/UD are total-dose pocket dosimeters capable of indicating total exposure to radiation on a scale of 0-600 rads (figure 1). The IM93/UD series dosimeter is designed to be carried like a ballpoint pen, and will allow the soldier to determine the total amount of radiation he has been exposed to over a given period of time. It is normally distributed to a representative number of squad or platoon members, to allow the commander to determine the average radiation exposure within the entire unit.



*Figure 1.*

2. To read the IM93/UD series pocket dosimeter:
  - a. Remove the rubber cap from the charging end of the dosimeter.
  - b. Point the dosimeter at a light source and hold the viewing end of the dosimeter to the eye.
  - c. Read the value on the scale covered by the hairline (figure 2).

★ **NOTE:** The difference between pocket dosimeters is the scale. The IM-93/PD scale is marked from 0-200 millirads and the IM-93/UD is marked from 0-600 rads.



*Figure 2.*

d. Report the total number of rads indicated to your supervisor.

★ **NOTE:** Material marked in this manner is different or not included in the 11B and 11C series Soldier's Manuals.

#### **REFERENCES:**

FM 21-40, NBC (Nuclear, Biological, and Nuclear) Defense, Oct 77 (app B, page B-16)

TM 11-6665-214-10, Operator's Manual: Radiacmeters IM93/PD, IM93/UD, IM93A/UD, and IM-147/PD, C1-3, Nov 62 (chap 4, page 20)

**TASK NUMBER: 071-327-0201**

---

**MAINTAIN AN APPROPRIATE LEVEL OF  
PHYSICAL FITNESS (MALE ONLY)**

---

**CONDITIONS:**

You will be tested to measure your physical fitness. If you are assigned to a combat or combat support unit, you will be given the Advanced Physical Fitness Test. If you are assigned to a combat service support unit or a TDA organization, you will be given the Staff and Specialist Physical Fitness Test. This test will be in daylight at a site established for the physical fitness test appropriate to your unit.

**STANDARDS:**

You must demonstrate, once every 6 months, that you can meet or exceed the minimum level of physical fitness required of each member of your unit in accordance with the standards contained in AR 600-9 by:

1. Exceeding the minimum standard score of 60 points on each test event with a total score of 300 or more points on the Advanced Physical Fitness Test if you are under the age of 40 and are assigned to a combat or combat support unit.
2. Exceeding the minimum standard total score of 300 or more points on the Staff and Specialist Physical Fitness Test if you are under the age of 40 and are assigned to a combat service support or TDA unit.

**PERFORMANCE MEASURES:**

1. Complete the five events of the Advanced Physical Fitness Test (APFT) listed below, as outlined in FM 21-20.
  - a. Inverted crawl.
  - b. Run, dodge, and jump.
  - c. Horizontal ladder.
  - d. Bent-leg situps.
  - e. Two-mile run.
2. Personnel over the age of 40 may elect not to take the APFT. If they elect to take it, they must complete the test once they have begun the first event or else they will receive a NO GO for the entire test.

3. Complete the five events of the Staff and Specialist Physical Fitness Test listed below, as outlined in FM 21-20.

- a. Pushups.
- b. Run, dodge, and jump.
- c. Horizontal ladder.
- d. Bent-leg situps.
- e. One-mile run.

**SQT REQUIREMENTS:**

1. Failure to meet the standards for either test will result in an evaluation of NO GO. Personnel with profiles, who cannot complete all five events of either test, will be scored as nonobserved on the performance certification portion of the SQT.

2. SQT credit will be awarded as follows:

<u>EVALUATION</u>	<u>SQT POINTS</u>
NO GO	0
GO	1
NONOBSERVED	Neither counts for nor against total SQT score

**REFERENCES:**

AR 600-9, Army Physical Fitness Program and Weight Control Program, Nov 76 (chap 2, pages 2-1 thru 2-2, para 2-1 thru 2-6)  
FM 21-20, Physical Readiness Training, C3, Mar 73 (chap 24-26, pages 211-253, para 386-424)

CHAPTER 2

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION II**  
**COMBAT TECHNIQUES**

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**TASK SUMMARIES**



**TASK NUMBER: 071-326-0502**

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**MOVE UNDER DIRECT FIRE**

---

**CONDITIONS:**

During daylight, at a field location containing varied terrain and vegetation, armed with an M16A1 rifle or M203 grenade launcher, wearing web gear, seasonal camouflage uniform (if available), and SCOPES target numbers. You will be opposed by an enemy sniper in a concealed position at least 200 meters away armed with an M16A1 rifle with a 6X rifle telescope (SCOPES equipment) and blank ammunition. You will move as a member of a two-man buddy team over a route which maximizes use of available cover/concealment.

**STANDARDS:**

Within 15 minutes, move to within 100 meters of the enemy position without being hit (scoped).

**PERFORMANCE MEASURES:**

1. **How to Select Individual Movement Route** (within your team/squad route or axis of advance) (figure 1).

a. Search the terrain to your front for:

(1) A gully, ravine, ditch, wall, etc., which is at a slight angle to your direction of movement. (These features provide cover and concealment when the low or high crawl is used.)

(2) Hedgerows or a line of thick vegetation. (These provide only concealment when the low or high crawl is used.)

(3) Large trees, rocks, stumps, fallen timber, rubble, vehicle hulks, folds or creases in the ground, etc. (These provide cover and concealment for use as temporary positions. Use the rush if the area between them has no concealment.)

(4) High grass, weeds, etc. (Provides only partial concealment since use of high or low crawl could reveal your location by the movement of vegetation. You might have to use the rush.)

b. Select your next position (and route to it), which:

(1) Exposes you the least to enemy fire.

(2) Does not require you to cross in front of other members of your element and mask their fires.



Figure 1.

## 2. Determining the Correct Individual Movement Technique:

### a. Use the high crawl when:

- (1) The route you have selected provides cover and concealment.
- (2) Poor visibility reduces enemy observation.
- (3) The terrain/vegetation are suitable only for the low crawl but speed is required.

### b. Use the low crawl when:

- (1) The route you have selected provides cover or concealment less than 1 foot high.
- (2) Visibility provides good enemy observation.
- (3) Speed is not required.



c. Use the rush when:

- (1) You must cross open areas.
- (2) Time is critical.

### 3. To High Crawl (figure 2).

a. Keep your body free of the ground and rest your weight on your forearms and knees. Cradle the rifle in your arms, keeping its muzzle off the ground.

b. Move forward by alternately advancing your right elbow and left knee; left elbow and right knee, etc.



Figure 2.

### 4. To Low Crawl (figure 3):

a. Keep your body as flat as possible to the ground and grasp the rifle sling at the upper sling swivel, letting the balance of the rifle rest on your forearm and the butt of the rifle drag on the ground.

b. To move forward, pull with your arms and push with your right or left leg, changing legs frequently to avoid fatigue.

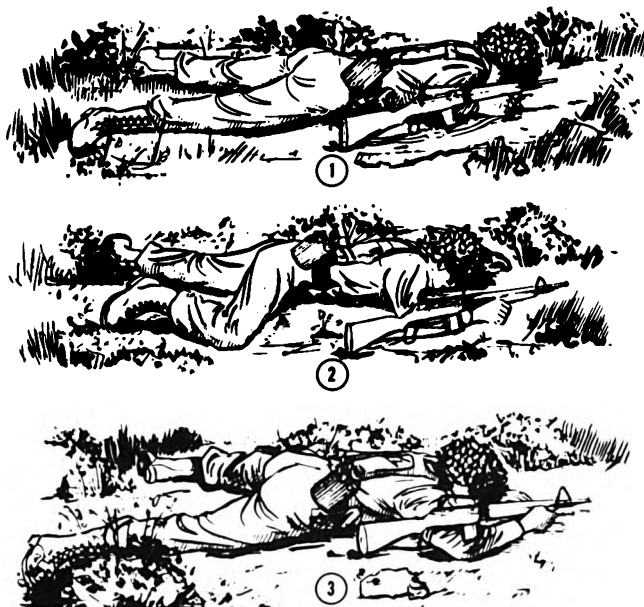
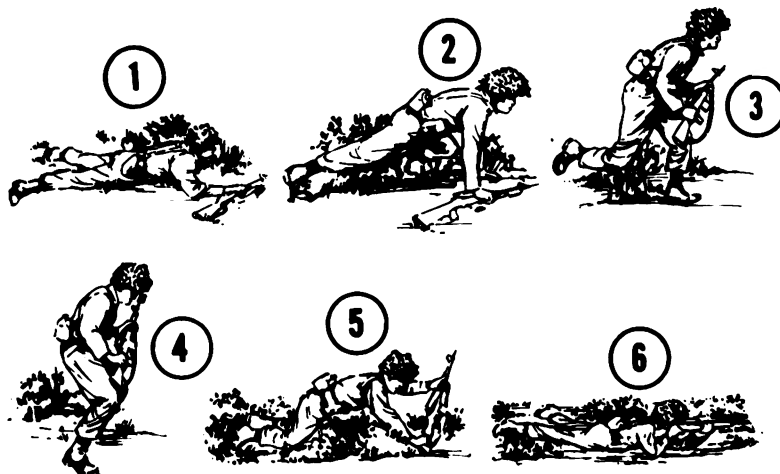


Figure 3.

**5. To Rush (figure 4):**

- a. Start from the prone position by slowly raising your head and selecting your next position.
- b. Lower your head, draw your arms in to your body, keep your elbows down, and pull your right (left) leg forward.
- c. With one movement, raise your body by straightening your arms, spring to your feet, and step off with either foot.
- d. Run to the next position and, just before hitting the ground, plant both feet.
- e. Fall forward, breaking your fall with the butt of the rifle.
- f. Shift the weight of your body to your left (right) side, place the butt of the rifle in the hollow of your shoulder, and then roll into a firing position.



*Figure 4.*

**TRAINING NOTES**

**1. Short rushes from covered position to covered position may be used when enemy fire allows brief exposure. Maneuver teams, buddy teams, or individuals may advance by short rushes to avoid accurate enemy fire. Try not to stay up any longer than 3 to 5 seconds so that you don't give the enemy time to track you with his automatic fire. The rule is to rush from cover to cover. Don't hit the ground in the open just because you have been up for 5 seconds.**

**2. Don't rush from a position from which you've been firing; roll right/left or crawl before springing to your feet.**

**3. When you complete a rush to a position providing concealment but no cover (weeds, bushes, etc.), roll or crawl to a new position before firing.**

**4. When you move as a member of a buddy team, you must communicate (talk to, watch and signal, etc.) with each other. Insure that one man covers by fire any movement by the other man. When moving as a member of a fire team, watch and listen to your team leader; he will lead you along the best route (covered and concealed) available and insure that covering fire is provided when you move. STAY WITH HIM AND FOLLOW HIS EXAMPLE.**

**REFERENCES:**

**FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (chap 3, page 3-24)**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 020-071-1042-F, React to Indirect Fire**

**TEC Lesson 937-061-0031-F, Camouflage, Cover and Concealment, Part 2**



**TASK NUMBER: 071-326-0510**

---

**REACT TO INDIRECT FIRE**

---

**CONDITIONS:**

You are a member of a squad/section other than team leader or squad leader.

**Situation 1:** You are not moving (i.e., in day or night defensive position or during a break in a tactical movement). You hear either the sound of incoming rounds or someone shouting "Incoming!"

**Situation 2:** Your squad/section is making a foot movement. You hear either the sound of incoming rounds or someone shouting "Incoming!"

**STANDARDS:**

React to each situation IAW performance measures below.

**PERFORMANCE MEASURES:**

1. If you are subjected to an indirect fire attack, there is a good chance you will have some warning before the first shell explodes in your area. This warning may be either of the following:

- a. The sound of incoming shells.
- b. A shouted warning of "Incoming" from someone who hears the shells coming before you do.
- c. The sound of shells passing overhead or exploding nearby, but not yet zeroed in on your location.

2. The first thing you should do is shout or repeat "Incoming," when you hear any of the above warnings. This is standard procedure for incoming indirect fire and will alert others who might not have heard the warning. Indirect fire will normally be from artillery, mortars, rockets, or similar weapons.

3. Look to your fire team/squad leader before taking any other actions.

4. Actions to take if not moving:

- a. When you hear any of the warnings in paragraph 1a, b, or c, shout "Incoming!"

b. Remain in your defensive position, taking advantage of any available cover. If your defensive position has not been dug yet, then look for some type of cover that will protect you from indirect fire.

c. Any movement away from your position could let the enemy know exactly where you are.

d. Incoming indirect fire (zeroed in on your position) may be an indicator of a coming attack by ground forces.

**5. Actions to take if moving:**

a. When you hear any of the warnings in paragraph 1a, b, or c, shout "Incoming!"

b. Follow your team leader's actions.

**REFERENCES:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 010-071-1042-F, Reacting to Indirect Fire**

**TASK NUMBER: 071-326-0511**

---

**REACT TO FLARES**

---

**CONDITIONS:**

At night, upon hearing a flare rising or when suddenly illuminated by a ground or overhead flare.

**STANDARDS:**

React as specified for each situation listed in the performance measures.

**PERFORMANCE MEASURES:**

React as follows for each situation:

1. **Ground flares:** move out of the illuminated area, and:
  - a. When alone, reorient yourself and continue mission.
  - b. As a member of a combat element, regroup (by SOP or as instructed) and continue mission.
2. **Overhead flare with warning** (sound of rising flare): assume a prone position (behind concealment when available) before the flare bursts.
3. **Overhead flare without warning:**
  - a. Get into the prone position, making maximum use of nearby cover, concealment, and shadows until the flare burns out. Close one eye to protect your night vision; observe with the other. (See figure 1.)
  - b. When crossing wire obstacles where the prone position is not possible, crouch low until flare burns out.
4. **Ground or overhead flare while under direct enemy fire or followed by direct enemy fire:** use fire and maneuver (select temporary position, rush, low crawl, etc., as specified in applicable tasks) as you would during daylight.



*Figure 1.*

**REFERENCES:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 020-071-1049-F, Reacting to Flares**

**TEC Lesson 937-061-0031-F, Camouflage, Cover and Concealment, Part 2**



**TASK NUMBER: 071-326-0503**

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**MOVE OVER, THROUGH, OR AROUND OBSTACLES**

---

**CONDITIONS:**

During daylight, at a field location moving over a route with manmade obstacles (two walls and two barbed-wire entanglements), given one smoke grenade, wood or grass mat, or chicken wire, and a grappling hook. You will be opposed by an OPFOR in a concealed position armed with an M16A1 rifle with 6X telescope (SCOPES equipment), located at least 200 meters away.

**STANDARDS:**

Within 20 minutes, move along the predesignated route to within 100 meters of the OPFOR without being hit (scoped).

**PERFORMANCE MEASURES:**

1. Use smoke as an effective method of concealment to cover your advance while crossing the obstacle.
2. Barbed wire obstacles:

**WARNING:**

1. First, check it for boobytraps or early warning devices. It is threat doctrine to attach trip wire-activated mines to barbed wire. A grappling hook with a length of rope attached should be used first to pull the wire. Before pulling wire, check for early warning devices attached to the wire.

2. If no such devices are found, then cross the barbed wire, using one of the methods listed in paragraph 2.

a. To cross over the barbed wire, you may put a wood or grass mat, or chicken wire netting, over it. Cross carefully because such a mat or net forms an unstable path (figure 1a).

b. To cross under the wire, slide headfirst under the bottom strands on your back. Push yourself forward with your shoulders and heels. Carry your weapon lengthwise on your body. Let the wire slide on the weapon to keep the wire from catching on clothing and equipment. Inch your way along, holding the wires with one hand (figure 1b).

c. If it is necessary to cut your way through wire, cut only the lower strands. Leave the top wire in place to make it less likely that the enemy will discover the gap. Wrap cloth, such as rifle patches, around the wire between

your hands and cut partly through the wire. Quietly bend the wire back and forth until it separates (figure 2).



*Figure 1a.*



*Figure 1b.*

# REMEMBER

Obstacles are always covered by either fire or observation.



*Figure 2.*

3. To negotiate minefields or boobytraps, see **TASKS: Locate mines by visual means, and Neutralize enemy mines.**

4. To cross roads, trails, or small streams, select a point at or near a bend in the road or stream—if possible, a bend that has concealment and cover on both sides. This will offer less chance of being seen by the enemy when crossing. Crawl up to the edge of the open area and observe the other side carefully before crossing. Cross rapidly but quietly. Get down on the other side; check the area around you (figure 3).

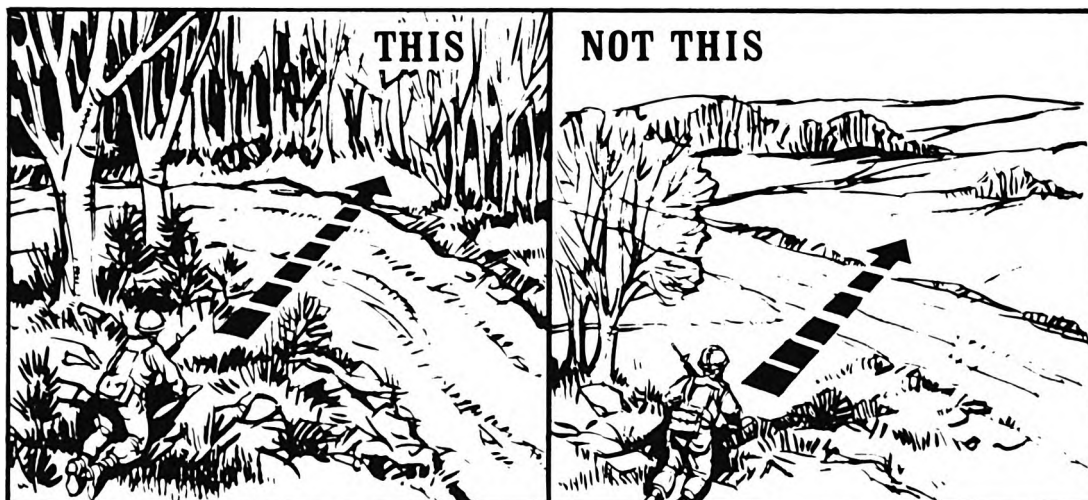


Figure 3.

5. To go over a wall, roll quickly over the top to avoid going over upright (figure 4). When crossing an obstacle such as a wall, use the buddy system: one man covers while one crosses.

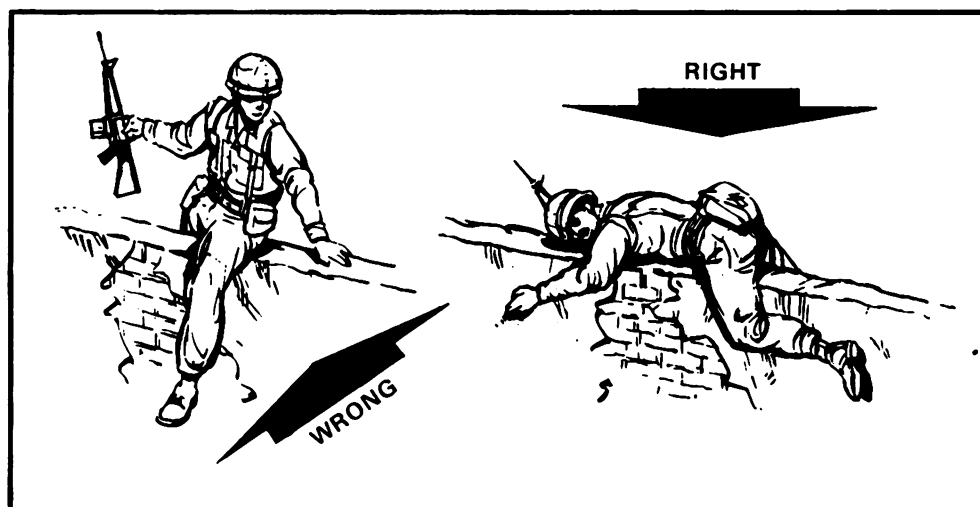


Figure 4.

#### REFERENCES:

FM 21-75, Combat Training of the Individual Soldier and Patrolling

TEC Lesson 947-071-0071-F, Breaching Artificial Obstacles



**TASK NUMBER: 071-326-0512**

---

**ESTIMATE RANGE**

---

**CONDITIONS:**

Given personnel, equipment, and silhouettes and/or vehicles, all stationary and either partially or fully exposed, at ranges from 50 to 3,000 meters, during daylight with good visibility.

**STANDARDS:**

State the actual range to each target with no more than a 20% error (plus or minus).

**PERFORMANCE MEASURES:**

1. **General.** The ability to estimate range is one of the most difficult skills for a combat soldier (infantry, armor, artillery) to learn, but it is also one of the most indispensable skills when needed. The four methods of estimating range discussed in this task are:

- a. Football-Field Method.
- b. Recognition/Appearance-of-Objects Method.
- c. Flash-to-Bang Method.
- d. Binocular-Reticle/Mil-Relation Method.

2. **Football-Field Method.** Even though the length of a football field is 100 yards instead of 100 meters, it is a unit of measure that most soldiers are familiar with and can be used in range estimation.

a. Become familiar with the appearance of 100-meter (football field) intervals on the ground (figure 1).

b. For ranges up to 500 meters, estimate the number of football fields between you and the target.

c. For ranges between 500 and 1,000 meters, pick a point halfway between you and the target. Then determine the distance to the halfway point as described above. Double the estimate to find the range to the target (figure 2).

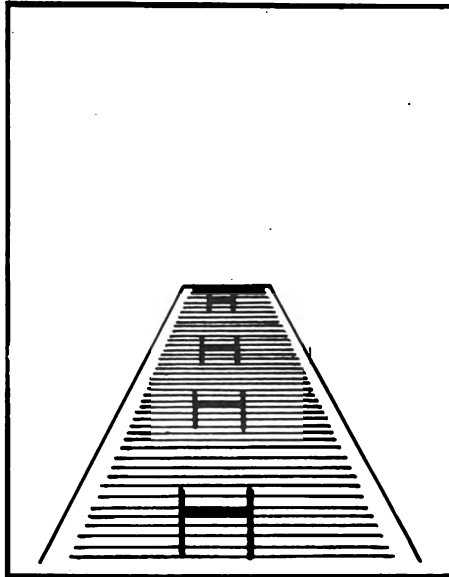
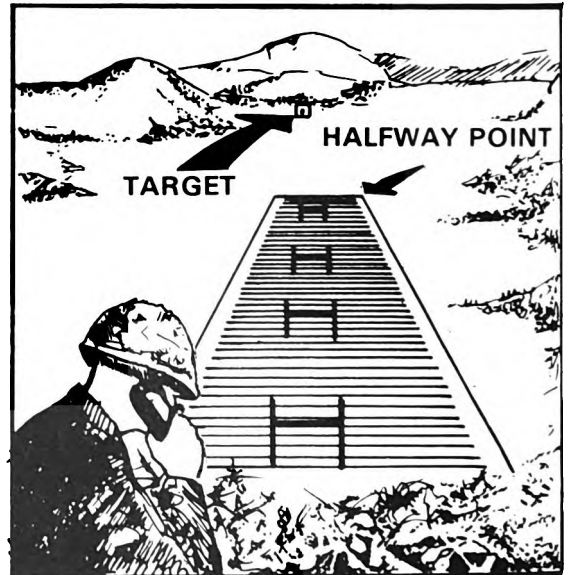


Figure 1.



Example: Distance 700 meters  
Figure 2.

d. In using this method, learn the effects of terrain and weather conditions on target appearance, as shown in figure 3.

## TARGET APPEARANCE

### SEEMS CLOSER

- Bright clear day
- Sun in front of target
- Higher elevations
- Large targets
- Bright colors (white, red, yellow)
- Contrast
- Looking across ravines, hollows  
rivers, depression
- At sea

### SEEMS FARTHER

- Fog, rain, hazy twilight
- Sun behind target
- Lower elevations
- Small targets
- Dark colors
- Camouflaged targets

Figure 3.

### 3. Recognition/Appearance-of-Objects Method.

a. Although the target conditions in figure 3 will have some effect on range estimation, the data in figure 4 will generally hold true. For example, in figure 4, with the naked eye you should be able to identify armored and wheeled vehicles from 1,500 to 2,000 meters. If you can positively identify the vehicle as a tank but cannot determine the model, it is between 1,000 and 1,500 meters. As shown in figure 4, binoculars greatly increase the range at which you can identify your target.

b. If possible, study the appearance of men and objects at various distances until you know how far away they are by how big or clear they seem to be.

RANGE DETERMINATION RECOGNITION METHOD		Naked Eye	Magnification
T A R G E T	Tank Crew Members, Troops, Machinegun, Mortar, Antitank Gun, Antitank Missile Launchers	500	2,000
	Tank, APC, Truck, <i>by Model</i>	1,000	4,000
	Tank, Howitzer, APC, Truck	1,500	5,000
	Armored Vehicle, Wheeled Vehicle	2,000	6,000
			M E T E R S

*Figure 4.*

#### 4. Flash-to-Bang Method.

- a. In this technique, range is determined by measuring the time between the flash and the gun report (figure 5).
- b. Sound travels through the air at a fairly constant speed, about 300 meters per second. Comparatively, light travels in no time at all. Range can be determined if you can see and hear the action.
- c. Observe the flash of the target/weapon firing.
- d. Count the number of seconds until you hear the weapon fire. This time interval may be measured on a stopwatch, or by estimation, using a steady count such as, **"ONE-THOUSAND-ONE, ONE-THOUSAND-TWO, ONE-THOUSAND-THREE,"** for a 3-second count. If you must count higher than 10 seconds, start over at one.
- e. Multiply the number of seconds by 330 meters to get the approximate range from the target to your position.

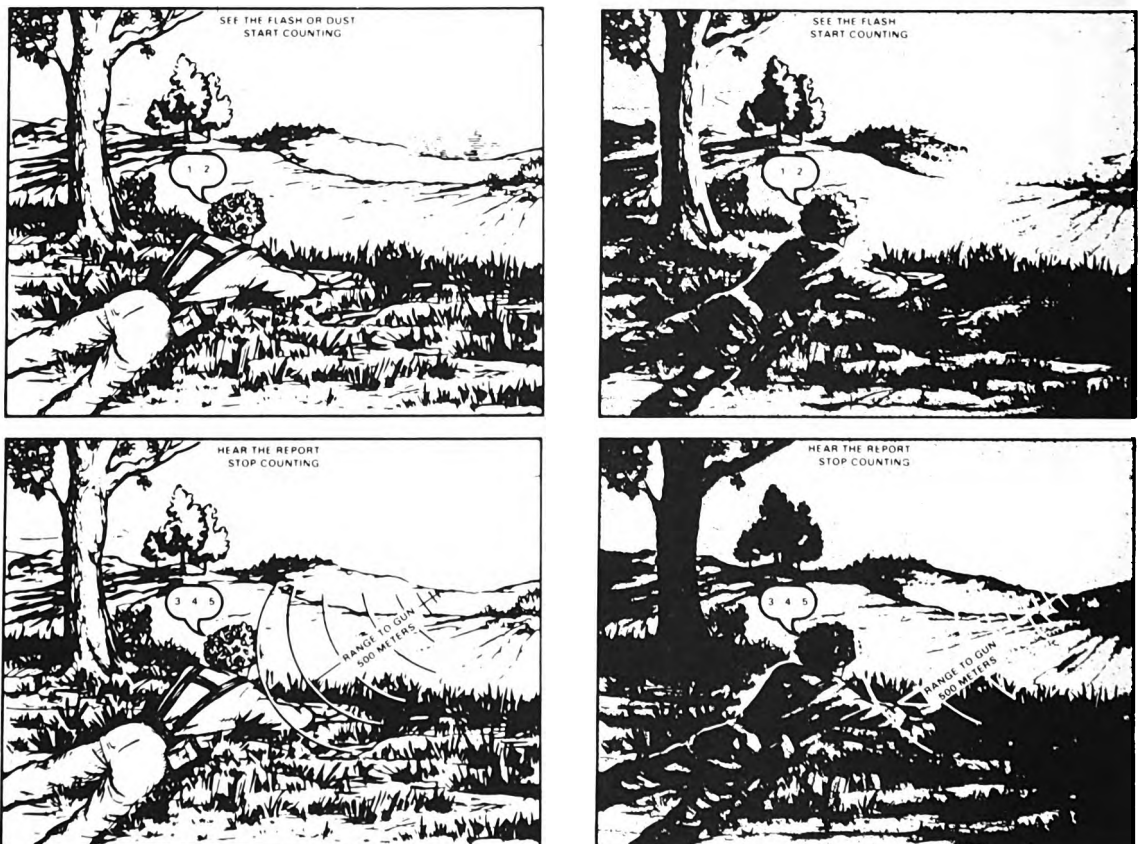


Figure 5.  
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### 5. Binocular-Reticle/Mil-Relation Method.

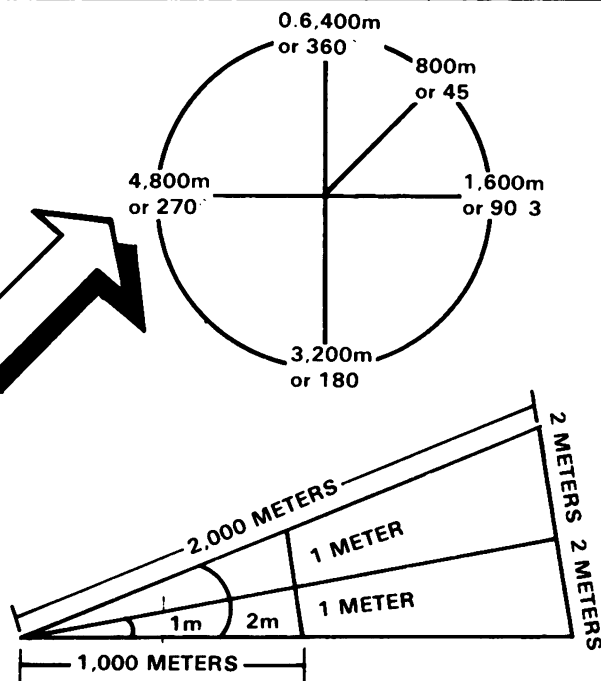
a. The one drawback to the binocular-reticle/mil-relation method of range estimation is that you must know the width, length, or height of the target. For an explanation of the mil and meter relationship, see figure 6.

**Mil relation.** The mil is a unit of angular measurement equal to  $1/6,400$  of a circle. There are approximately 18 mils in 1 degree. One mil can be written 1m. The mil is used because of the precise calculations and adjustment required. Fire control equipment is graduated in mils to conform to the mil method of measurement.

#### A COMPARISON OF MILS AND DEGREES

One mil equals width (or height) of 1 meter at a range of 1,000 meters.

This relation is constant as the angle increases from 1 mil to 2 mils and the range increases from 1,000 meters to 2,000 meters. Because the mil relation is constant, other units of measure such as yards, feet, or inches can be substituted for meters in expressing width or range; however, the relation holds true only if both W and R are expressed in the same unit of measure. For example, if the sides of a 1-mil angle are extended to 1,000 yards the width between the ends of the sides is 1 yard.



1 MIL AT 1,000 METERS EQUALS 1 METER.  
 1 MIL AT 2,000 METERS EQUALS 2 METERS.  
 2 MILS AT 1,000 METERS EQUALS 2 METERS.  
 2 MILS AT 2,000 METERS EQUALS 4 METERS.

Figure 6.

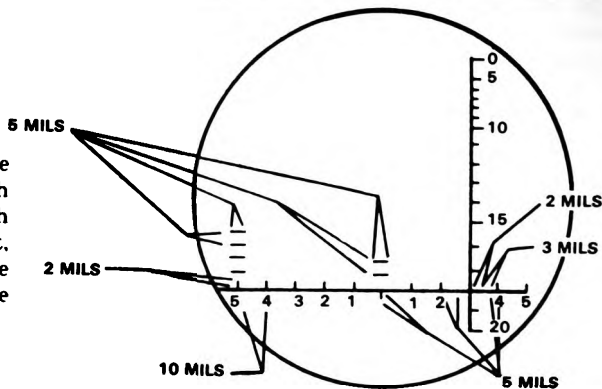
MIL ANGLE MEASUREMENT			1	2	3	4	5	5	7	8	9	10
Threat Medium Tank	Length: 6.5 meters	RANGE	6,500	3,300	2,200	1,600	1,300	1,100	900	800	700	700
	Width: 3.5 meters		3,500	1,800	1,200	900	700	600	500	400	400	400
Threat Heavy Tank	Length: 7.5 meters		7,500	3,800	2,500	1,900	1,500	1,300	1,100	900	800	800
	Width: 3.5 meters		3,500	1,800	1,200	900	700	600	500	400	400	400

Figure 7.

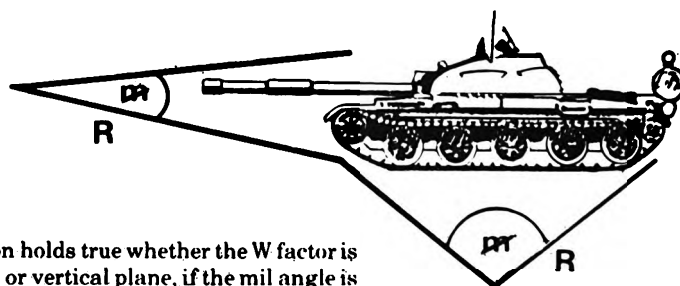
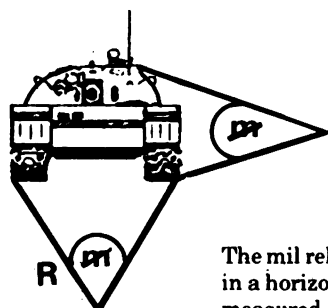
b. To determine the width, length, or height of the target in mils using your binocular reticle see figure 8 and figure 9.

c. Using the known width, length, or height in meters and measured mil value, you can determine the range by using the formula  $\frac{W}{R \times m}$ , or to make it simpler  $R = \frac{W}{M}$  (figure 9). Figure 7 shows the computations for targets at various ranges.

*Determining range using the mil relation.* Since the relationship of the angle in mils ( $m$ ), the length of the sides in thousands ( $R$ ), and the width between the ends of the sides ( $W$ ) is constant, width of the target, range to the target, or mil value of the target can be determined if the other two are known.



**BINOCULAR RETICLE**



The mil relation holds true whether the  $W$  factor is in a horizontal or vertical plane, if the mil angle is measured in the same place.

As a memory aid use the word, "WORM."  
WORM stands for:

**Times**

**W** idth in meters  
**O** ver  
**R** ange in thousands  
**M** ils

$$\frac{W}{R \times m}$$

*Figure 8.*

2-II-A-5.6

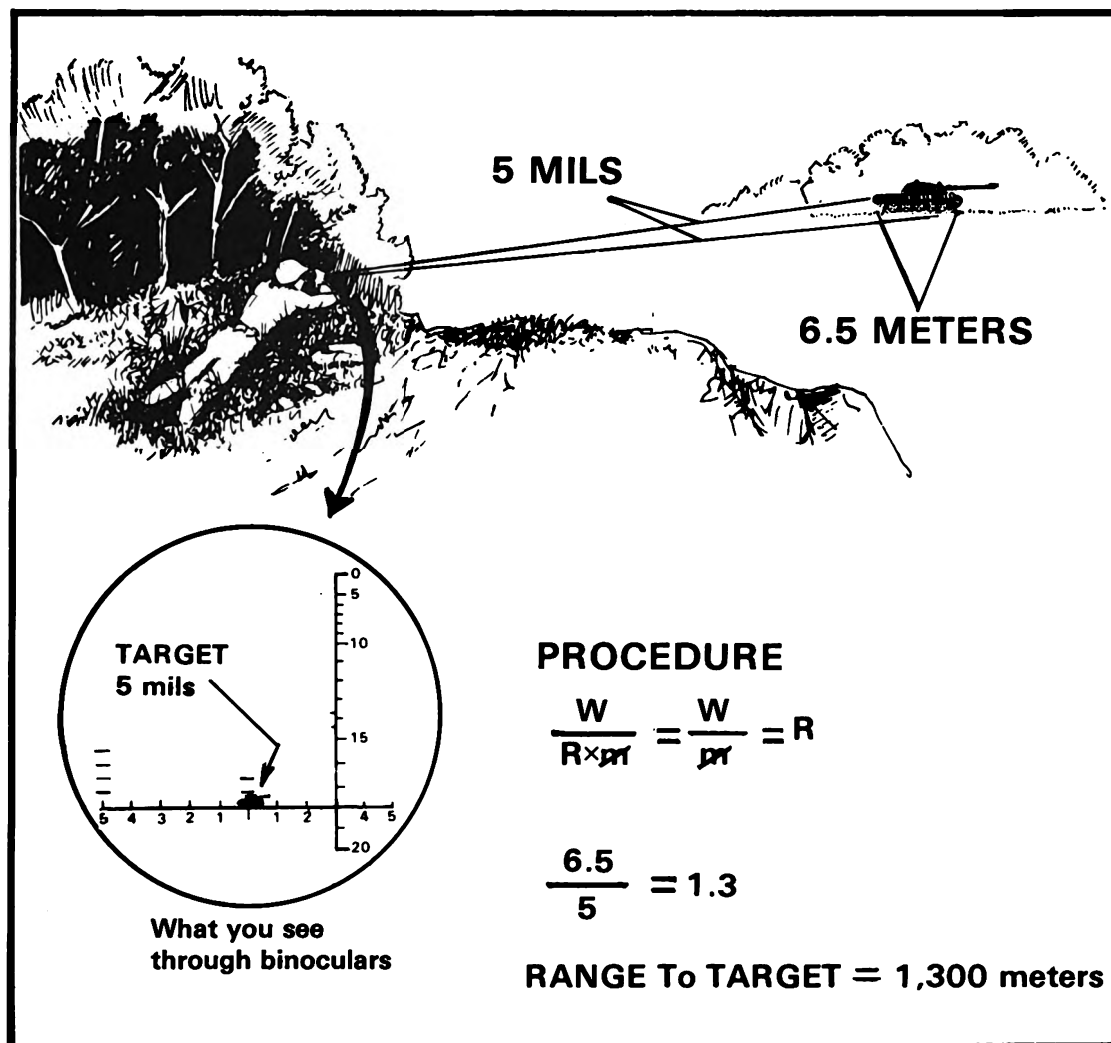


Figure 9.

**REFERENCES:**

FM 17-12, Tank Gunnery, Mar 77, (pages 7-2 thru 7-10)

FM 21-26, Map Reading

FM 21-75, Combat Training of the Individual Soldier and Patrolling, Jul 67, (page 12)

TEC Lesson 020-171-1611-F, Target Range Determination

TEC Lesson 020-171-1613-F, Use of Binocular Reticle and Worm Formula



**TASK NUMBER: 071-326-0513**

---

**SELECT TEMPORARY BATTLEFIELD POSITIONS**

---

**CONDITIONS:**

During daylight or darkness; at an overwatch position; after initial movement into tentative defensive positions; at a halt during movement; or upon receiving direct fire.

**STANDARDS:**

1. Select and occupy a firing position which allows good observation, fields of fire, and provides (in order of priority):
  - a. Cover and concealment, or
  - b. cover only, or
  - c. Concealment only.
2. Remain as low as possible (prone where possible) and look (aim) around rather than over objects.

**PERFORMANCE MEASURES:**

Select temporary firing or observation positions which take advantage of available cover and concealment (figure 1).

1. Observe and fire around the side of an object. This conceals most of your head and body.
2. Stay low to observe and fire whenever possible. You can aim better and take advantage of concealing vegetation to present the smallest possible target to enemy observation and fires.
3. Select a good background before observing. A good background does not silhouette the individual.
4. Follow team leader's directions after your initial selection of temporary battlefield position; he might reposition you to gain better team coverage of the area.



**TASK NUMBER: 071-326-5703**

---

**CONSTRUCT INDIVIDUAL FIGHTING POSITION**

---

**CONDITIONS:**

As a member of a two-man team, in daylight, given load-bearing equipment with bayonet, scabbard, entrenching tool, poncho, and M16A1 rifle; the specific location and sector of fire of the position to be constructed (NOTE: Position should afford natural cover such as mounds or earth, stumps, trees, rocks, etc., and observation and fields of fire); logs to construct overhead cover; and 4 hours to complete construction.

**STANDARDS:**

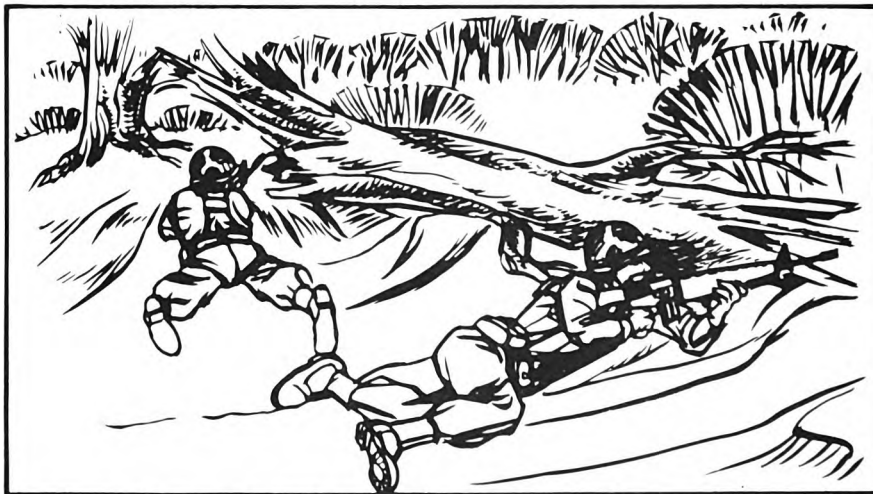
Within time specified, completed position must meet the following specifications:

**NOTE:** Time may be adjusted when soil and weather conditions make construction of positions particularly difficult.

1. **Cover** - Affords protection from direct frontal small-arms fire (by means of a natural or manmade frontal parapet high and thick enough to protect your head completely while manning your weapon) and from effects of indirect fire (shrapnel) (normally requires at least 12 inches of dirt/log overhead protection).
2. **Concealment** - Position cannot be easily detected from front (e.g., blends with surroundings well enough that an approaching soldier approximately 35 meters to front (hand-grenade range) cannot detect it).
3. **Fields of Fire** - Limiting stakes are emplaced and correctly define sector of fire. Soldier can observe anyone moving through his sector. Fields of fire have been selectively cleared so that anyone moving into the sector will not recognize it as being a cleared area.
4. **Size and Shape** - As a minimum, position should be shoulder wide, armpit deep, and provide enough room for the soldier to engage targets in his sector using the normal foxhole firing position.
5. **Optional** (dependent on available time) - Position includes grenade sump, sloping floor with shallow trench to facilitate drainage, elbow holes to stabilize firing position and to lower silhouette when firing, range card, and night firing stakes.

## PERFORMANCE MEASURES:

**1. Hasty Fighting Positions.** When you first move into a battle position, you may have very little or no time to prepare the position from which you must fight. If that is the situation, then occupy a hasty fighting position. A hasty fighting position is behind some natural object on the terrain that affords you frontal protection from direct fire but also allows you to fire forward.



Note that the term hasty position does not mean that you can't dig. Even if you only have a few minutes, you can dig or scrape out a prone shelter that will give you increased protection.

**2. Improved Fighting Positions.** As time and conditions permit, the position can be improved, but the natural cover that was initially used in the hasty position will still be the basis for constructing your fighting position.



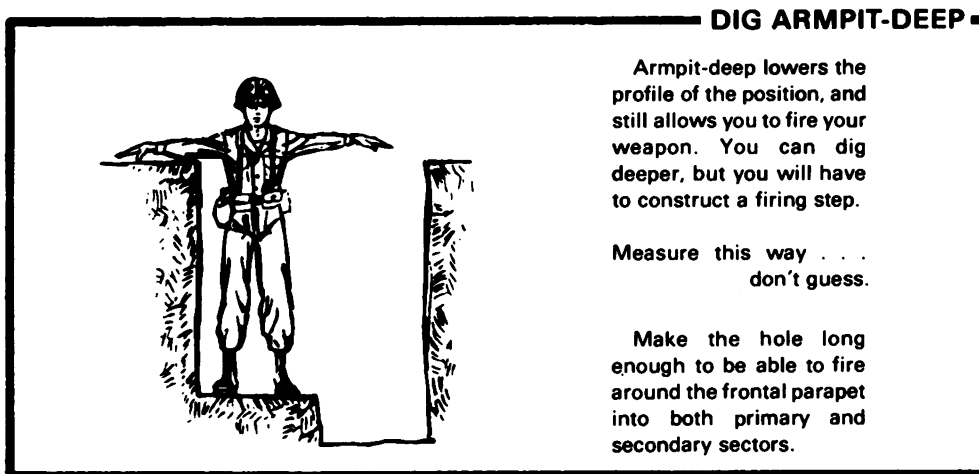


3. **Basic Position.** The basic improved fighting position is a two-man hole. It should be as small as possible to provide the greatest amount of protection against the fragmentation effects of explosives, and to make it easy to camouflage. However, it must be large enough for two men and their weapons, equipment, and ammunition. Construction of a fighting position should generally follow this sequence:

a. Obtain position location and sector of fire from your squad leader. Put in sector-of-fire stakes.

b. Partially clear fields of fire within your sector and dig a hasty hole for minimum protection. Be careful not to destroy natural camouflage around your position. Save grass clumps, etc., for camouflage later. At this point, you should be able to fight effectively in the event of a surprise attack.

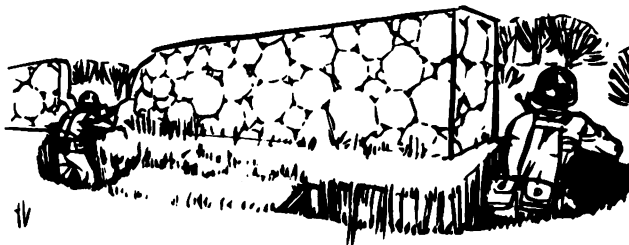
c. Next, dig in. Make hole armpit deep (figure 1a). If you have a natural frontal parapet, carry away and camouflage dirt from hole; if not, make frontal parapet with hole dirt as shown in figure 1b.



*Figure 1a.*

(1) Use the dirt from your hole to build the frontal parapet or save it for use as flank, overhead, and rear cover later. Carry away and camouflage excess dirt.

(2) Shape the hole to fit the natural cover available. Depending on the size and shape of the frontal cover that you are using, you may not be able to dig a rectangular hole. It may look like this --



(3) Frontal cover. Ideally, a natural parapet such as a tree, mound, rock, or stump that will blend with the surrounding terrain will be available. Otherwise, you must build your own parapet using dirt from the hole. At least the equivalent of 18 inches of earth should be between you and the enemy. Frontal cover is important so you can shoot without exposing your head to enemy fire.

#### PROVIDE SUPPORT FOR THE FIRER

The space between the hole and the frontal protection should be wide enough to allow the soldier to fire from a supported position (one with elbows on the ground).



Supported fire to the front.



Unsupported fire to the front.

Figure 1b.



ROCKS ARE OK FOR  
LIMITING STAKES

Place AIMING STAKES toward especially dangerous approaches so you can lay your weapon on these approaches even at night.

Place LIMITING STAKES right and left, to define your sector of fire; they will also prevent accidental firing into adjacent positions.

#### NOTE:

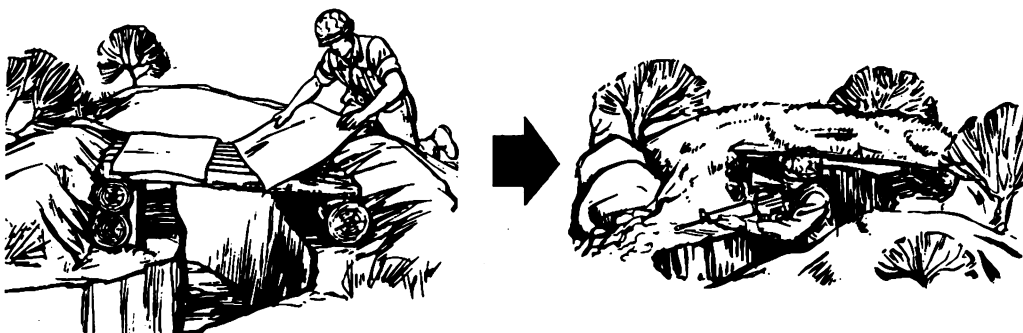
Care must be taken not to destroy the concealment of the position with limiting stakes.

d. Complete clearing fields of fire. Clear only what is absolutely necessary. Get in firing position and check observation and fields of fire. Save any cut foliage, dirt, grass clumps, etc., for camouflage of position.

**e. Construct fighting overhead cover.**

(1) Cover should provide best possible protection from airbursts and allow you to fight from underneath it.

(2) Logs/dirt should be 12 inches thick. Check your protection by standing on the overhead cover. If it feels solid under your weight, it will probably protect you from airburst shrapnel.



**CONSTRUCTION OF FIGHTING OVERHEAD COVER**

**f. Construct flank overhead cover when fighting overhead cover would significantly increase the silhouette of the position, making it vulnerable to detection. Construct as follows:**

**1**

Dig this area out to a depth of about 12 inches, saving the sod for camouflage.



**2**

Next, put supporting logs, planks, or whatever is available across the area to support the rest of the overhead cover material.



**3**

Fill up the hole, piling dirt on top of the log cover and camouflaging it with sod. Make it look natural.



**4**

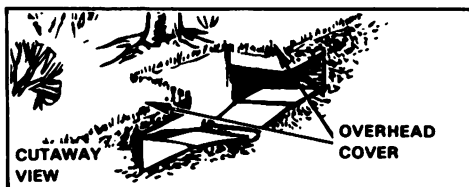
Then get in your hole and dig out a cave-like compartment under the cover.



Use the excavated dirt to add to and strengthen your parapet or your overhead cover. Excess dirt should be carefully carried away and hidden.

## OTHER WAYS TO BUILD OVERHEAD COVER

ONE WAY

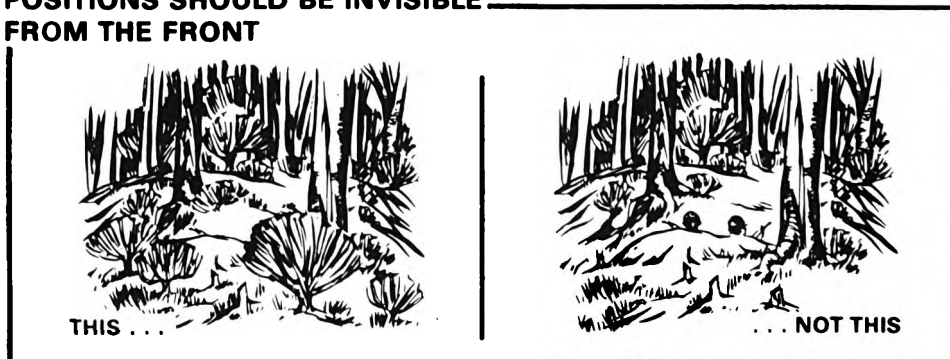


ANOTHER WAY



g. Camouflage position using available materials (grass clumps, foliage, etc.). Make your position blend into surroundings. Check camouflage by moving 35 meters to the front; if you can spot it easily, you need more work on camouflage.

## POSITIONS SHOULD BE INVISIBLE FROM THE FRONT



**NOTE:** Task Number 051-202-1003, Camouflage/conceal defensive positions, will give you more detailed information on this performance measure.

h. Improve your position as time permits:

(1) To insure complete protection for fighting positions, flank and rear cover is necessary. It protects against the effects of indirect fire that bursts to the flanks/rear of the positions and against the effects of friendly supporting weapons located in the rear.

(2) Dig grenade sump at 45-degree angle and at least 2 feet deep. Slope floor of foxhole and dig shallow trench to allow for drainage. Put in night firing stakes and make a range card. Improve camouflage. Construct alternate and secondary positions as directed by your squad leader. Replace dead foliage as needed to maintain camouflage.

**REMEMBER,**

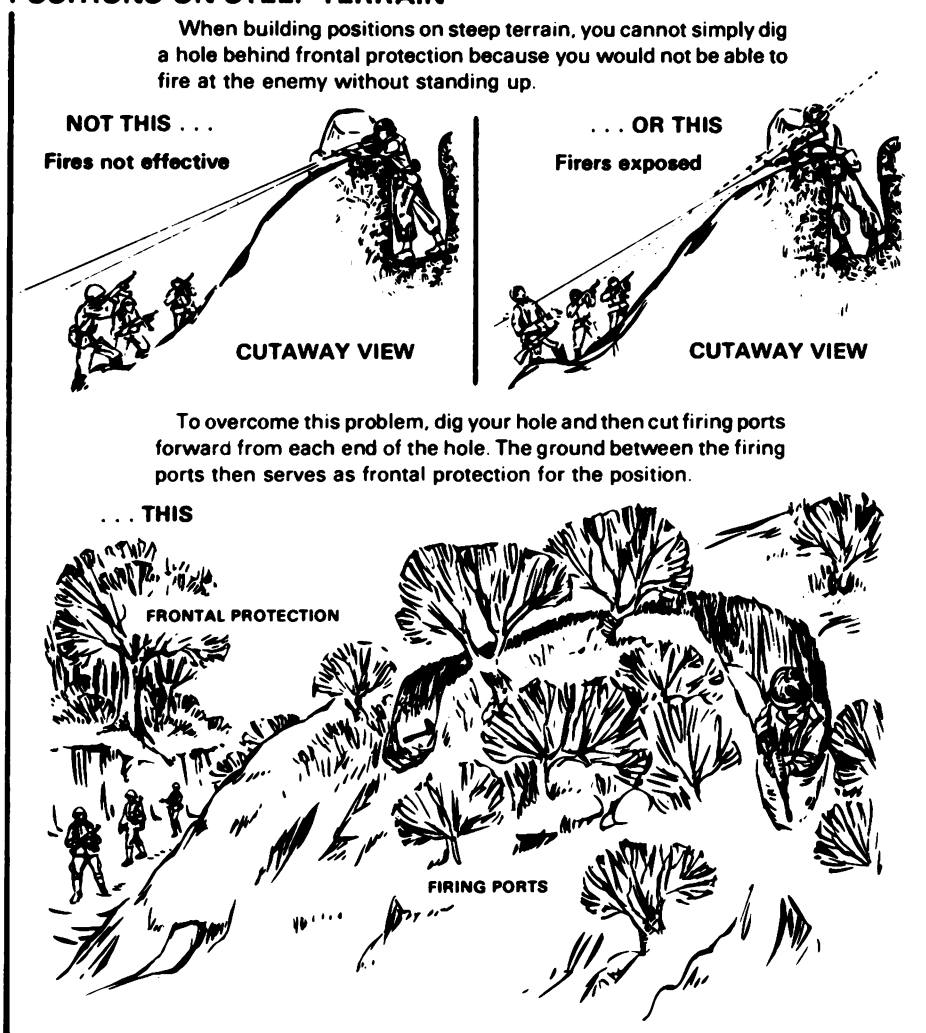
**you can always improve your position.**

**4. Variations of the Basic Fighting Position.** The terrain will sometimes force you to modify the basic construction of your position in order to fight effectively. Some variations are:

- a. One-man fighting position.
- b. Modified two-man position.
- c. Positions on steep terrain.

**NOTE:** Appendix C, FM 7-7, The Mechanized Infantry Platoon and Squad, provides specific information on construction techniques for these types of fighting positions.

#### POSITIONS ON STEEP TERRAIN



#### REFERENCES:

FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (app C, pages C-1 thru C-18)



**TASK NUMBER: 071-326-0600**

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**USE VISUAL SIGNALS TO CONTROL MOVEMENT  
(DISMOUNTED)**

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**CONDITIONS:**

Given a combat or field training situation with necessary flags or flashlights, and you are moving dismounted. Radio communications may or may not be available, and radio silence may or may not be imposed.

**STANDARDS:**

1. Skill Level 1: Demonstrate the correct procedure for each signal in the performance measures below.
2. Skill Level 2: Train each member of your squad to recognize each signal and require them to take appropriate actions.

**PERFORMANCE MEASURES:**

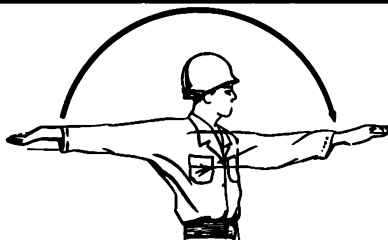
1. Visual communication is a means available to all units. Visual signals are transmitted by flags, lights, pyrotechnics, panels, arm-and-hand signals, and other prearranged methods. They are suitable for transmitting prearranged messages rapidly over short distances as well as for recognition and identification of friendly forces.
2. Visual signals also facilitate ease in controlling the action(s) or movement(s) of the follower and conversely visual signals can influence the action(s) or movement(s) of the leader.
3. It is important that you familiarize yourself with all the visual signals used on the battlefield. However, it is more important that you know those signals which can assist you in performing your specific job effectively in the event alternate means of communication are not available.
4. Signals for combat formations and battle drill.
  - a. These signals may be used, as appropriate, by either mounted or dismounted troops. They give the soldier a means of communication between himself and other persons or units. They must be practiced until their use becomes second nature. Signals must be given correctly and distinctly.
  - b. When a movement or action is to be executed by less than the total unit, the signaler will point, if necessary, toward the person(s) or element(s) of a unit as a warning that a signal will follow. However, when a movement or action is to be executed by the entire unit, the proper signal should be preceded by the signal ATTENTION. Most signals may be given from the ground or from a vehicle. Unless otherwise indicated in the illustrations, the







**JOIN ME, FOLLOW ME, COME FORWARD, or MOVE VEHICLE FORWARD.** Point toward person(s), vehicle(s), or unit(s); beckon by holding the arm horizontally to the front, palm up, and motioning toward the body.



**ADVANCE or MOVE OUT.** Face the desired direction of movement; hold the arm extended to the rear; then swing it overhead and forward in the direction of desired movement until it is horizontal, palm down.



**FIX BAYONETS.** Simulate the movement of the right hand in removing the bayonet from the scabbard and fixing it on the rifle.



**HALT or STOP.** Raise the hand upward to the full extent of the arm, palm to the front. Hold that position until the signal is understood.



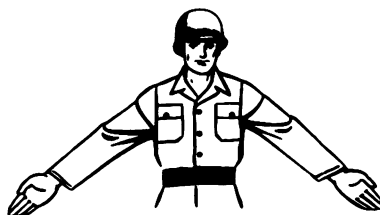
**INCREASE SPEED, DOUBLE TIME, or RUSH.** Raise the hand to the shoulder, fist closed; thrust the fist upward to the full extent of the arm and back to the shoulder rapidly several times.



**DECREASE SPEED (vehicle), QUICK TIME (dismounted troops).** Extend the arm horizontally sideward, palm to the front, and wave arm slightly downward several times, keeping the arm straight. Do not move arm above horizontal.



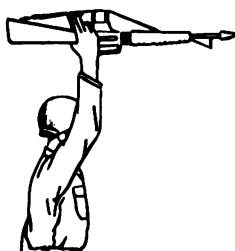
**ECHELON RIGHT (LEFT).** Extend one arm 45° above and the other 45° below the horizontal, palms to the front. The lower arm indicates the direction of echelon.



**WEDGE FORMATION.** Extend both arms downward and to the sides at an angle of 45° below the horizontal, palms to the front.



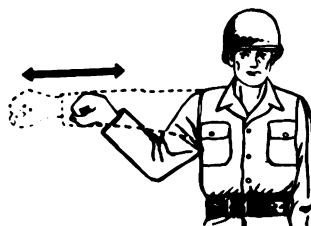
**COLUMN FORMATION (or FILE).** Raise either arm to the vertical position. Drop the arm to the rear, describing complete circles in a vertical plane parallel to the body. The signal may be used for a column of dismounted troops or a vehicular column.



**ENEMY IN SIGHT.** Hold rifle above the head with one arm, fully extended, with the rifle parallel to the ground and pointing in the direction of the enemy.



**LINE FORMATION.** Raise both arms to the side until horizontal, arms and hands extended, palms down.



**ACTION FRONT (RIGHT, LEFT, or REAR), FIGHT ON FOOT, or ASSAULT FIRE.** Raise fist to shoulder level and thrust it several times in the desired direction of action.

## SIGNALS FOR FIRE CONTROL AND POSITIONING OF CREW-SERVED WEAPONS AND INFANTRY FIRE TEAMS



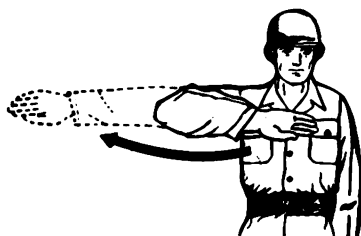
**PREPARE FOR ACTION.** Raise the fist to the waist and rotate forearm several times in horizontal, clockwise circles.



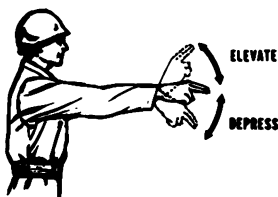
**OUT OF ACTION.** Strike the closed fist of one hand several times in rapid succession against the open palm of the other hand.



**CEASE FIRING.** Raise the hand in front of the forehead, palm to the front, and swing the hand and forearm up and down several times in front of the face.



**MOVE OVER or SHIFT FIRE.** Raise the hand that is on the side toward the new direction across the body to the opposite shoulder, palm to the front; then swing the arm in a horizontal arc, extending arm and hand to point to the new direction. For slight changes in direction, wave hand from final position (described above) to the desired direction of movement.



**TRAVERSE RIGHT (LEFT) or ELEVATE (DEPRESS).** Extend one arm in direction of gunner concerned. Move the hand in a vigorous movement in the direction of desired correction (elevate, depress, right, or left). Flex arm at wrist and expose one finger for each mil (or for each 100 meters of range) of desired correction. For machineguns, the extended fingers indicate 1 mil for tripod guns and 1 meter for bipod guns.



**COMMENCE FIRING.** Extend arm in front of the body, palm down, and move it through a wide horizontal arc several times. For machineguns: giving the signal again, moving the arm faster means "change to the next higher rate of fire." To slow the rate of fire, move the arm slower. (Used primarily for direct fire weapons.)

### REFERENCES:

FM 21-60, Visual Signals, Dec 74 (chap 2, page 2-1 thru 2-10, para 2-2).

**TASK NUMBER: 071-329-1021**

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**DETERMINE AN ENEMY TARGET LOCATION  
USING GRID COORDINATES**

---

**CONDITIONS:**

Acting as a forward observer at a known location, given binoculars (if available), a standard 1:50,000 scale military map, compass, coordinate scale and protractor, pencil, paper, and a target requiring indirect fire.

**STANDARDS:**

Determine the six-digit grid coordinates of the target (grid coordinates must be within 250 meters of actual target location) within 90 seconds after identification.

**PERFORMANCE MEASURES:****1. To orient a map using a compass:**

a. With the map in a horizontal position, place the compass with the straightedge along one of the north-south grid lines and the cover of the compass pointing toward the top of the map.

b. Rotate the map and compass until the north-seeking arrow is alined with the compass index-line.

c. This procedure will orient the map close enough to the terrain features to allow location of the target.

**NOTE: Do not move the map, once you have it oriented, until you have performed step 3.**

**2. To orient the map by terrain association:**

a. Knowing one of the four cardinal directions or a very identifiable natural or manmade terrain feature will increase the speed and accuracy in orienting the map.

b. Rotate the map until the terrain features to the front (hills, valleys, roads, or streams) are alined with the same terrain features on the map.

**NOTE: Do not move the map, once you have it oriented, until you have performed step 3.**

**3. To locate the target:** Identify it with one of the terrain features on the ground. Locate this terrain feature on the map and plot the target on the map in the same relation to it as it is on the ground.

**4. To determine the six-digit grid coordinates of the point plotted on the map:** See task: **Determine the grid coordinates of a point on a military map using the military grid reference system.**

**NOTE:** To call fire on the target you have just located, see task: **Call for/adjust indirect fire.**

## **REFERENCES:**

**None**

**TASK NUMBER: 061-283-6002**

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**LOCATE A TARGET BY SHIFT FROM A KNOWN POINT**

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**CONDITIONS:**

You will be given binoculars (if available), a compass, a pencil, and a 1:50,000 scale military map of the target area. You have identified a suspected target near a point known by you to include direction and plotted in the fire direction center (FDC). Your own location is plotted on your map.

**STANDARDS:**

Locate the target within 250 meters of the actual location. Announce target location within 90 seconds after identification. Express direction to the nearest 10 mils and within 100 mils of actual direction. Express right or left corrections to the nearest 10 meters. Express range corrections to the nearest 100 meters.

**PERFORMANCE MEASURES:****Definitions:**

1. **Deviation** - The distance in mils or meters a target is right or left of a known point or the distance in mils or meters a round bursts right or left of the target.
2. **Lateral shift** - The correction in meters the FO sends to the FDC to bring the mortar or artillery rounds onto the observer target (OT) line.
3. **Range correction** - The correction in meters the FO sends to the FDC to hit, bracket, or creep the mortar or artillery round onto the target for range.
4. **OT factor** - The known or estimated distance to a target or known point expressed in thousands (2500 meters would be expressed as 2.5) and used to convert the mils between two points to meters (lateral shift).

**1. Determine observer-target (OT) direction.****a. Measuring deviation from a known point to the target.**

(1) By binoculars: In looking through binoculars you will find a mil scale which is used to measure horizontal distance (figure 1). This scale is divided into 10-mil increments, with 100 mils across the scale. Let's say Hill

905 in figure 2 is your known point. You measure the deviation from Hill 905 to the target. The deviation is three 10-mil increments, or 30 mils right of Hill 905.

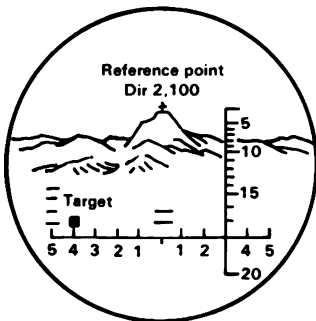


Figure 1.

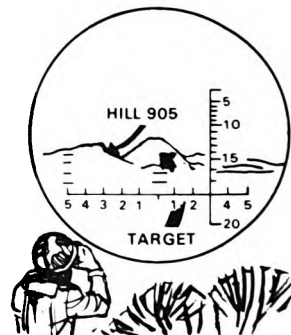


Figure 2.

(2) By the hand-and-finger method:

(a) If you do not have binoculars, you can use your hand and fingers to measure how many mils right or left of the known point the target is. One finger is about 30 mils; two fingers, 70 mils; and three fingers, 100 mils. See figure 3 for approximate hand and finger values. To use this method, with your arm fully extended, count the number of fingers it takes to cover the distance from the known point to the target. Then again referring to figure 3 you have a good approximation of the deviation. Using the same known point, Hill 905, and the same target, let's use fingers to measure the deviation (see figure 4). Extending the arm fully, you find the target one finger to the right of Hill 905. Recall that one finger is about 30 mils.

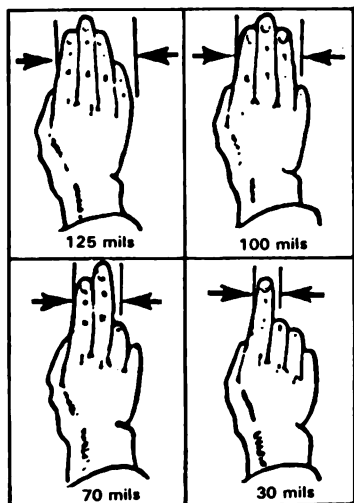


Figure 3.

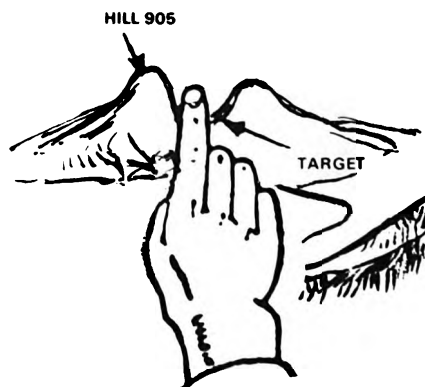


Figure 4.

(b) If degrees are being used, remember: 17.8 mils equals 1 degree. As a general guideline, you can equate mils and degrees by using the relationship 35 mils equals 2 degrees. The field artillery and mortars, however, would prefer measurement in mils. If it becomes necessary to use degrees, be sure you tell the FDC. Remember, your compass will measure mils as well as degrees.

b. Applying deviation. Apply the measured deviation to the known direction (if the target is right of the known point, add deviation; if the target is left of the known point, subtract the deviation).

**NOTE: An easy way to remember this is the RALS rule: right-ADD-left-SUBTRACT.**

(1) Right Deviations - Add. In figure 2, we know the direction to Hill 905 to be 3200 mils. With the binoculars, we measure the deviation to be 30 mils. Since the target is right of the known point we add the deviation (30 mils) to the known direction (3200 mils). The sum is the direction to the target (3230 mils).

$$\begin{array}{r} 3200 \text{ (direction to known point)} \\ +30 \text{ (right deviation - add)} \\ \hline 3230 \text{ (direction to the target)} \end{array}$$

(2) Left Deviations - Subtract. In figure 1, we know the direction to the reference point (2100 mils). With the binoculars, we measure the deviation to be 40 mils. Since the target is left of the known point, we subtract the deviation (40 mils) from the known direction (2100 mils). The answer (2060 mils) is the direction to the target.

$$\begin{array}{r} 2100 \text{ (direction to known point)} \\ - 40 \text{ (left deviation - subtract)} \\ \hline 2060 \text{ (direction to the target)} \end{array}$$

2. Determine the lateral shift from a known point to the target (see figure 5) using the mil relation formula.

a. The formula is expressed as  $\frac{W}{R\phi} = 1$ , where  $\phi$  is the angular measurement in mils between the two points, R is the distance in thousands of meters (expressed to the nearest 100) to the known points from which angle  $\phi$  was measured (figure 5), and W is the lateral distance in meters.

b. A convenient way of using the mil relation formula is to cover the value desired and perform the calculation indicated. For example, to find the lateral shift in meters, the lateral distance (W) would be covered leaving the range (R) to be multiplied by the mils ( $\phi$ ).

(1) For our purposes, the mil relation formula is used in conjunction with the distance to the known point expressed in thousands to the nearest 100 to determine lateral shift. The lateral shift in meters (W) is equal to the distance to the known point (R) times the angular deviation in mils (m).

(2) The distance to the known point is the distance from the observer to the known point (to the nearest 100 meters) divided by 1000. For example, if the distance to the known point (church in figure 5) is estimated to be 3,200 meters, the distance to the known point is 3.2.

$$\frac{3200}{1000} = 3.2$$

(3) Now we are ready to determine the lateral shift. We multiply the distance to the known point (3.2) by the angular deviation (30 mils); the product is the lateral shift (96 meters).

$$\begin{array}{r} 3.2 \text{ (R)} \\ \times 30 \text{ (m)} \\ \hline 96 \text{ (Lateral shift) R 100 (W)} \end{array}$$

Since the deviation is to the right, expressed to the nearest 10 meters, we shift Right 100.

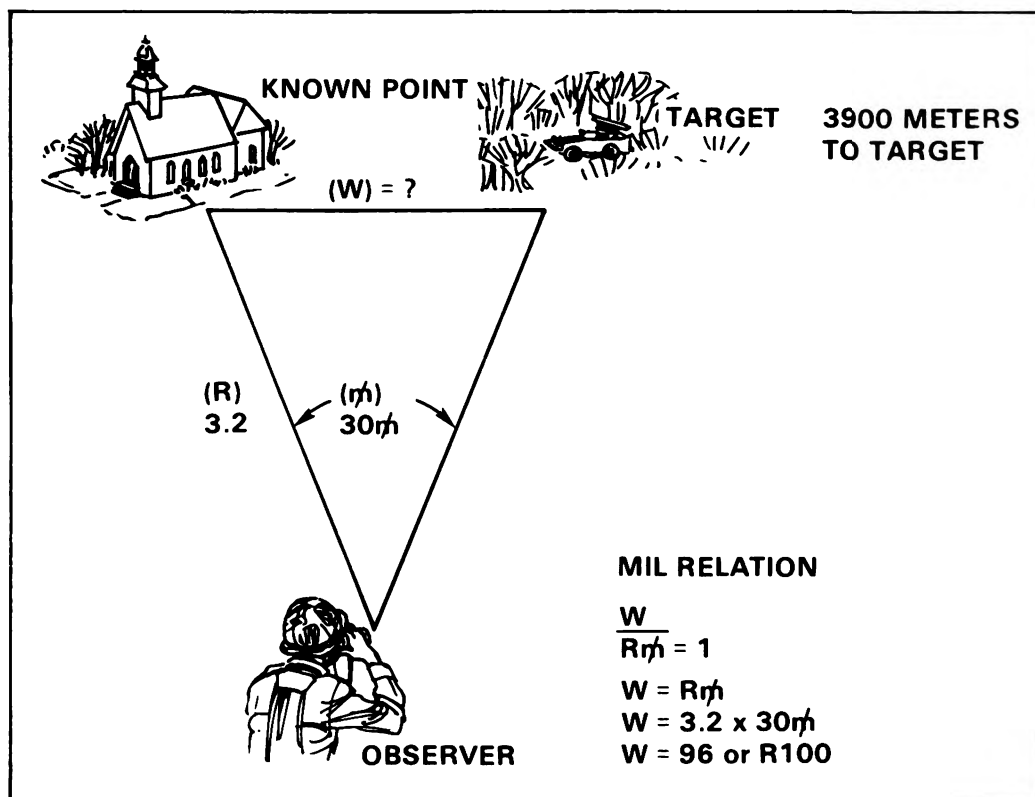


Figure 5.



3. Determine range change from the known point to the target (see figure 5).

a. The range change is estimated to the nearest 100 meters. If the target is beyond the known point, we add the range difference. If the target is closer than the known point, we drop the difference.

b. For example, if the distance to the known point is 3200 meters and the estimated distance to the target is 3900 meters, the range change is 700 meters ( $3900 - 3200 = 700$ ). Since the target is beyond the known point, we add 700. If the target distance is estimated at 2800 meters, the range change is 400 meters ( $3200 - 2800 = 400$ ). Since the target is closer than the known point, we drop 400.

**NOTE:** Task 071-329-1010, Determine azimuths using a coordinate scale and protractor, must be mastered as a prerequisite to this task.

## REFERENCES:

TC 6-40-4, Fire for Effect, Mar 77 (part 1, page 8, 10-17)  
 TEC Lesson 949-061-0001-F, Determination of Direction  
 TEC Lesson 949-061-0003-F, Locate a Target by Shift From a Known Point



**TASK NUMBER: 061-283-6003**

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**CALL FOR/ADJUST INDIRECT FIRE**

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**CONDITIONS:**

You will be given binoculars (if available), a radio, callsigns for fire direction center (FDC), a compass, a coordinate scale, a pencil, and a 1:50,000 scale military map of the target area (targets may vary in range up to 4,000 meters).

**STANDARDS:**

The initial request for fire must be made within 3 minutes after the target has been designated. Adjustments must be transmitted within 30 seconds after round impacts. Observer must achieve effect on the target within five adjustments. (NOTE: Round must impact within 50 meters of the target to achieve effect on the target.)

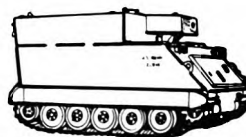
**PERFORMANCE MEASURES:**

1. Formulate and transmit the initial call for fire.
    - a. Locate the target by grid coordinate, shift from a known point, or polar plot.
    - b. Determine the direction from your position to the target.
    - c. Transmit the call for fire to the FDC on the FDC net. Include the following elements in sequence:
      - (1) Observer identification. (Your callsign)
      - (2) Warning order. (Adjust fire)
      - (3) Location of target. (Grid or shift data)
      - (4) Description of target. (What is the target? Platoon in the open ...)
      - (5) Method of engagement (may be omitted if area fire is desired).
- (NOTE: If target is within 600 meters of friendly troops, announce "Danger close.")
- (6) Method of fire and control.

The initial fire request for a mission using shift from a known point would be somewhat like example 1. The request for a grid mission would approximate example 2.

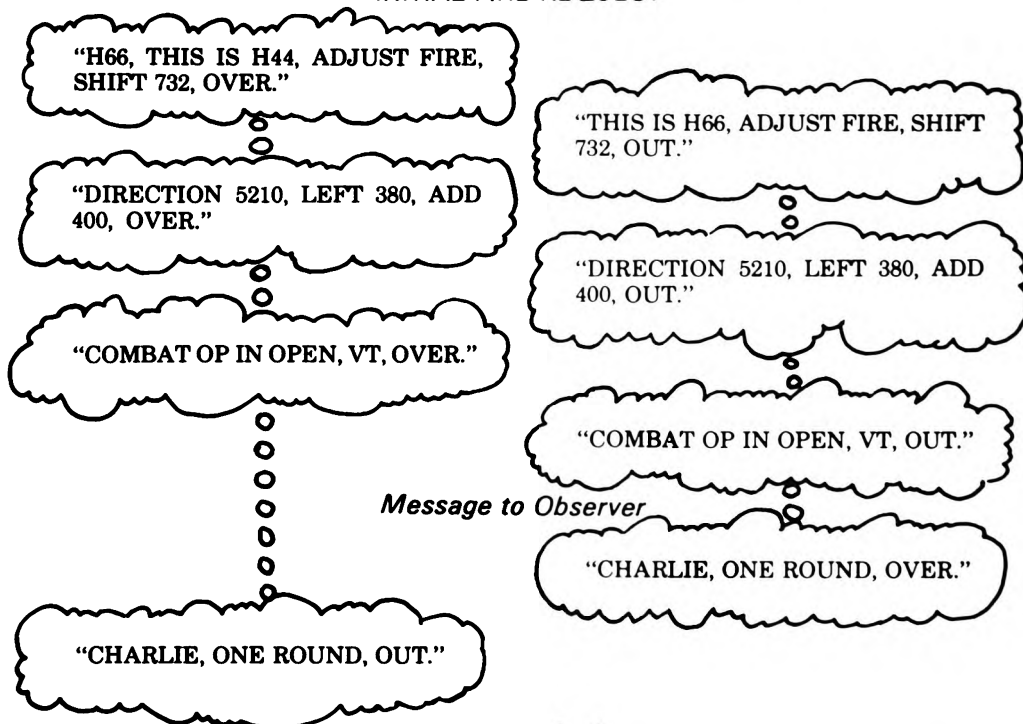


FO

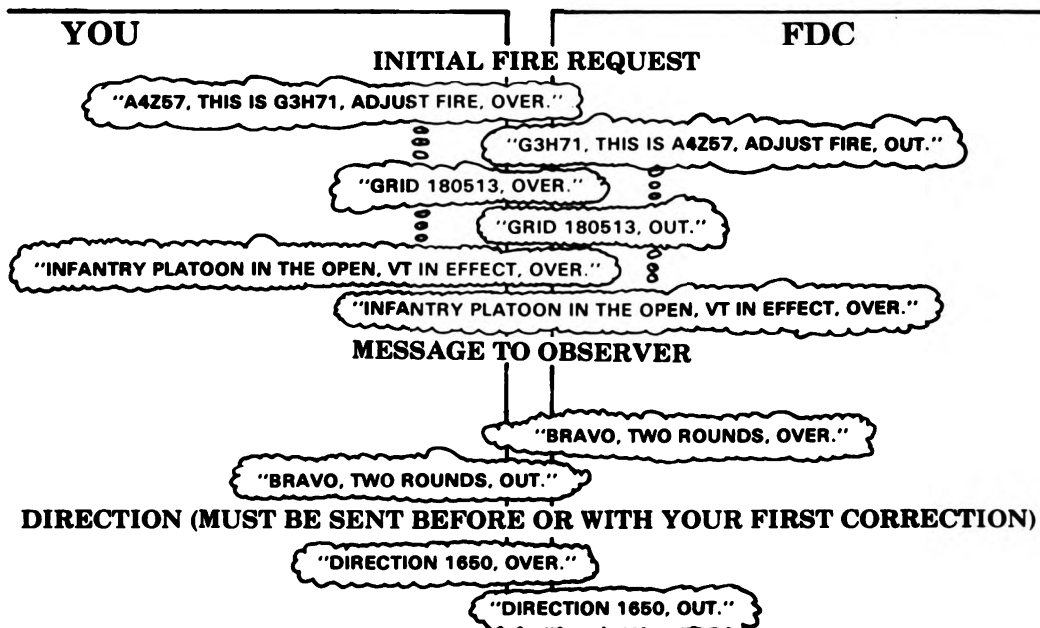


FDC

**INITIAL FIRE REQUEST**



**Example 1.**



**Example 2.**

2. Adjust fire onto the target using the bracketing method of adjustment.  
(See figure 1.)

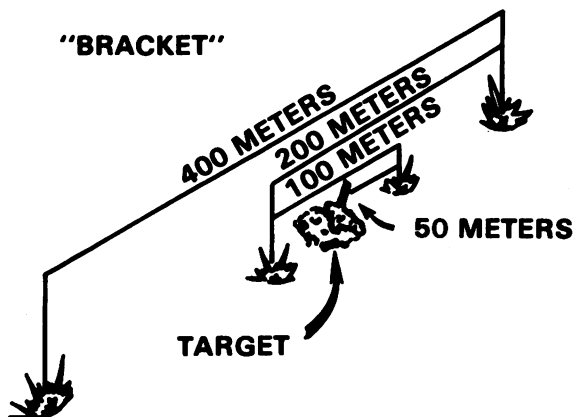


Figure 1.

a. Spot each round when it impacts as over or short, right or left of your target.

(1) When the first range spotting is observed, make a range correction that would result in a range spotting in the opposite direction; e.g., if the first round is short, add enough to get an over on the next round.

(2) Use the following guide to establish a bracket.

Round impact from target	Add or drop
Over 400 meters	+ or - 800 meters
200-400 meters	+ or - 400 meters
100-200 meters	+ or - 200 meters
less than 100 meters	- or - 100 meters

(3) Deviation.

(a) Measure the horizontal angle in mils, using either fingers or the reticle pattern in the binoculars (see figures 2 and 3). Estimate the range to the target and divide by 1000. This is the OT factor. If the OT distance is 1000 meters or greater, the OT factor is expressed to the nearest whole number. If the OT distance is less than 1000 meters, the OT factor is expressed to nearest 1/10th, e.g., 800 = .8. Multiplying the OT factor by the deviation measured in mils produces deviation in meters.

(b) For example, in figure 2 we measure the round 100 mils right of the target. Estimating the range to be 2,200 meters, the OT factor is 2.2. For adjustment purposes, we express the OT factor to the nearest whole number. Example: 1.1 would be 1; 1.8 would be 2; 2.5 would be 3. Multiplying the angle (100 mils) by the OT factor (2), we get the deviation in meters (200 meters right).

100 (deviation in mils)  
× 2 (OT factor)  
200 (deviation in meters)

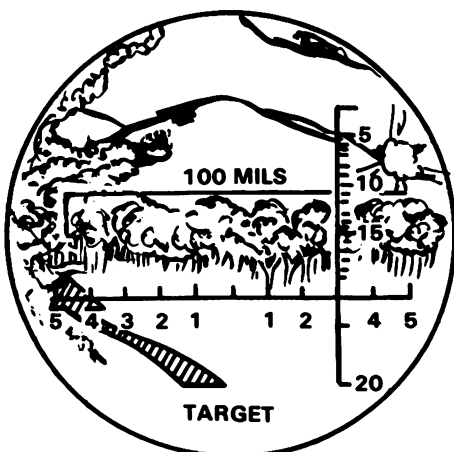


Figure 2.

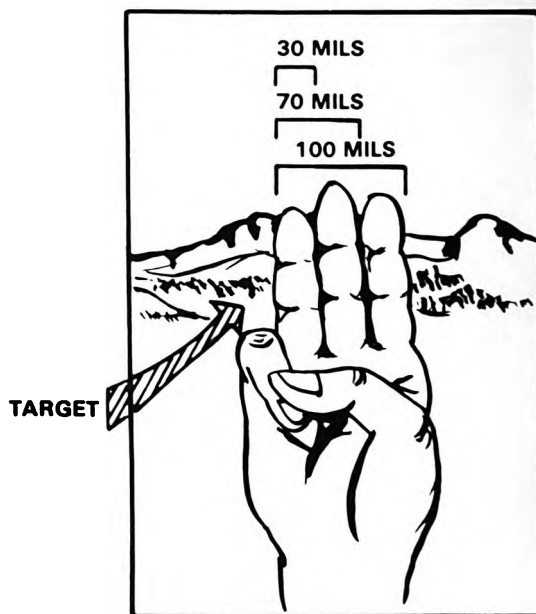
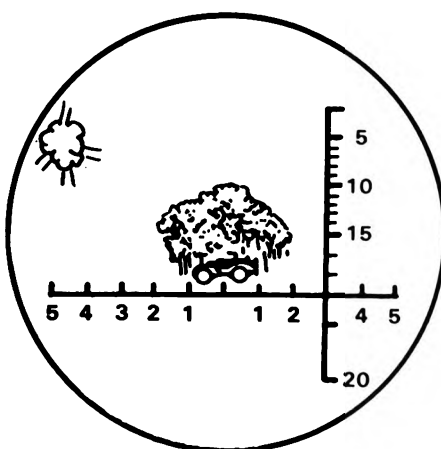


Figure 3.

b. Transmit corrections to the FDC in meters. The initial correction should bracket the target in range. Deviation corrections should be made to keep the rounds on line. Figure 4 shows the impact of your initial round. Since the round is beyond the target, you must drop. You estimate that the round is 250 meters beyond the target. Therefore, a 400-meter drop will give you a bracket.

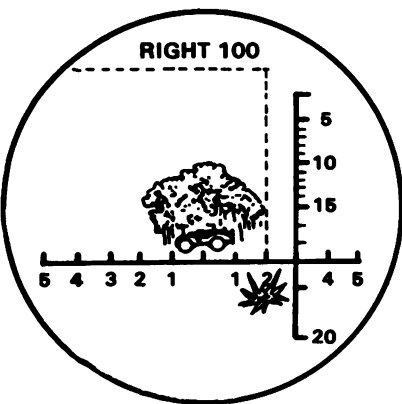
The round impacted 50 mils left of the target. With an OT factor of 2, the round impacted 100 meters left. Your correction to FDC is "Right 100, Drop 400, Over."



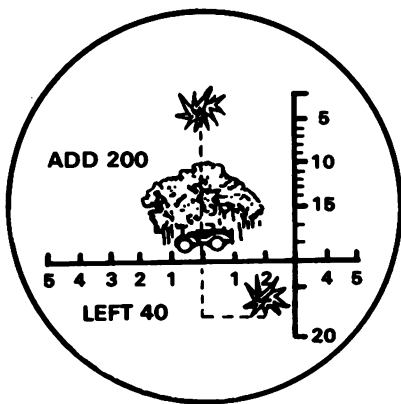
(MILS) X (OT) = (SHIFT)  
 50 X 2 = 100 METERS  
 "RIGHT 100, DROP 400, OVER"

Figure 4.

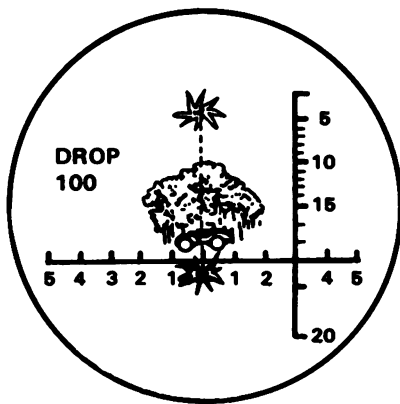
c. Continue splitting the range bracket until a 100-meter bracket is split or a range correct sensing is observed, maintaining deviation on line. Figures 5, 6, and 7 show the next three adjustments. Note that each deviation correction is made to keep the impacting rounds on line. The range corrections split the bracket each time. The adjustment phase of a fire mission would resemble example 3.



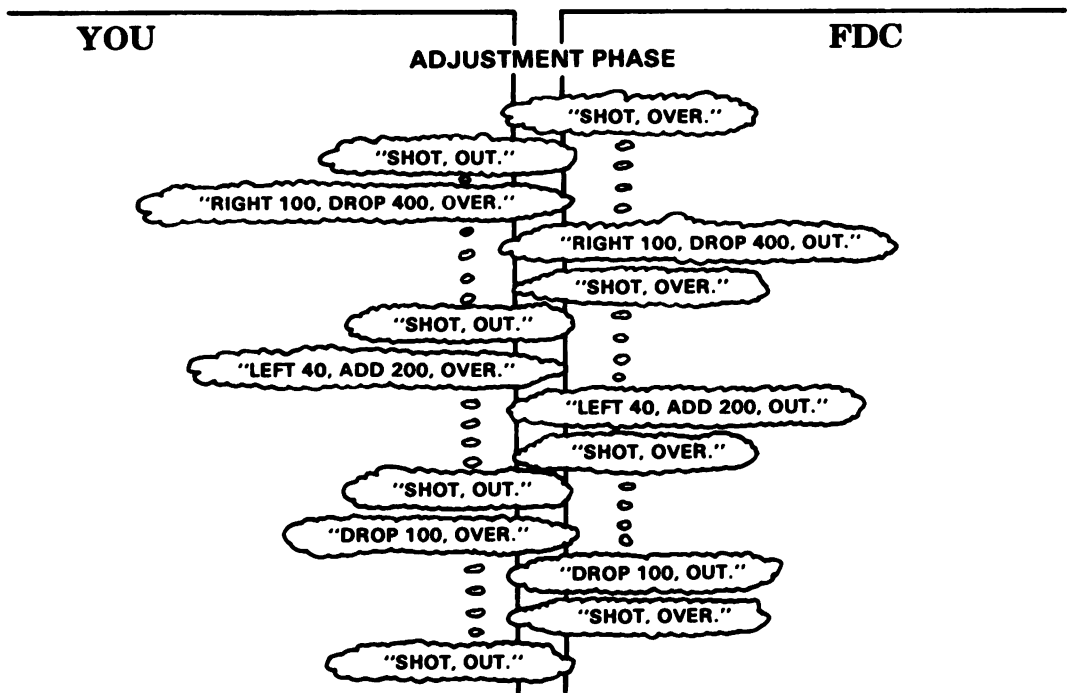
"LEFT 40, ADD 200, OVER"  
Figure 5.



"DROP 100, OVER"  
Figure 6.

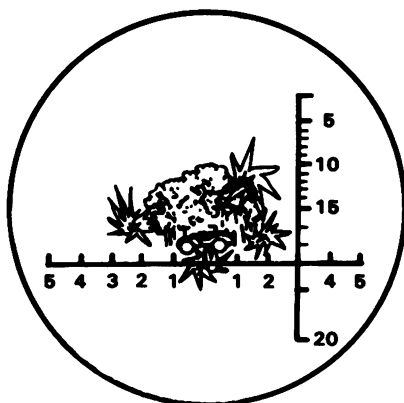


"ADD 50, FIRE FOR EFFECT, OVER"  
Figure 7.



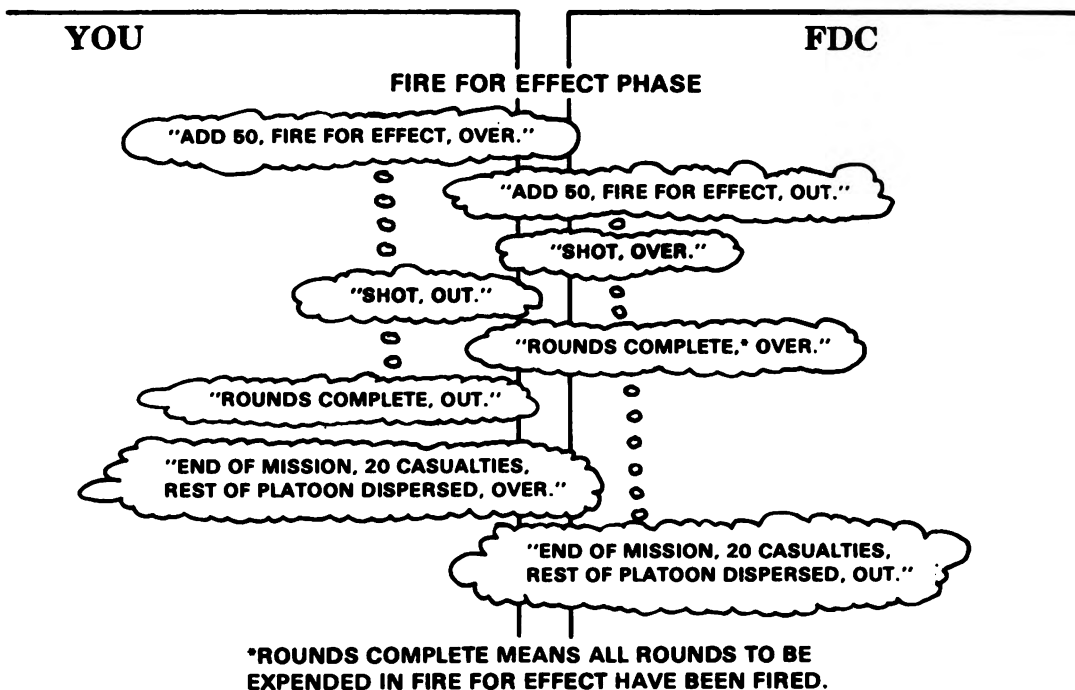
Example 3.

d. Initiate fire for effect. When a 100-meter bracket is split or a range correct spotting is made, the fire-for-effect phase is entered. Note that figure 7 shows the 100-meter bracket split and the call is **fire for effect**. Figure 8 shows a simulated pattern which might be observed in the fire-for-effect phase. (See example 4.)



"END OF MISSION"

Figure 8.



Example 4.

3. Observe the results of fire for effect and report the results. When the smoke clears, tell the FDC what the results are. Such things as the number of casualties, damaged equipment, stalled tracks, etc., are important. (See example 4.)



4. In the event that fire is required within 600 meters of friendly troops, the following guidelines apply.

- a. Announce "danger close" to the FDC in the initial call for fire.
- b. Initial target location is reported on the enemy side of the target.
- c. Creeping procedures are used to adjust danger-close fire.
  - (1) Range corrections should not exceed 100 meters.
  - (2) Never bracket; it could cause friendly casualties.

**NOTE:** In a hostile environment, authentication may be required before fire is delivered.

## **REFERENCES:**

TC 6-40-4, Fire for Effect, Mar 77 (part 1, page 2-8, 10-17; part 2, page 20-26; part 3, page 28-34; part 4, page 36-40.

TEC Lesson 949-061-0001-F, Determination of Direction

TEC Lesson 949-061-0002-F, Target Location: Polar Plot and Grid Coordinate Method

TEC Lesson 949-061-0003-F, Locate a Target by Shift from a Known Point

TEC Lesson 949-061-0005-F, Adjustment of Indirect Fire by the Bracketing and Creeping Methods, Part I

TEC Lesson 949-061-0006-F, Adjustment of Indirect Fire by the Bracketing and Creeping Methods, Part II



**TASK NUMBER: 071-326-5704**

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**SUPERVISE/EVALUATE CONSTRUCTION OF  
A FIGHTING POSITION**

---

**CONDITIONS:**

During daylight in a field or combat situation, given personnel, equipment, and a sector of responsibility.

**STANDARDS:**

Within specified time limits, the position is completed and meets the following minimum requirements.

1. **Cover** - Affords protection from direct frontal small arms fire (e.g., a natural or manmade frontal parapet high enough to protect head completely while manning weapon and from indirect fire (shrapnel) (normally requires at least 12 inches of dirt/log overhead protection).

2. **Concealment** - Position cannot be easily detected from the air or from 35 meters to the front (e.g., blends with surroundings well).

3. **Fields of Fire** - Limiting stakes correctly define sector of fire. Occupant in firing position has observation in sector and fields of fire which have been selectively cleared, but which have not destroyed natural camouflage.

4. **Size/Shape** - Position is armpit deep and at least shoulder wide (of occupant), provides a cave-like compartment with overhead cover big enough for occupant to get under.

5. **Optional** - If time permits, position includes grenade sump, sloping floor with shallow trench to facilitate drainage, elbow holes to stabilize firing position and to lower silhouette when firing, range card, and night firing stakes.

**PERFORMANCE MEASURES:**

Through supervision, evaluation, and on-the-spot corrections, insure that the construction of the individual fighting position generally follows the sequence below:

1. Assign position location and sector of fire. Individual should emplace sector-of-fire stakes.

2. Individual should partially clear fields of fire within his sector and dig a hasty hole for minimum protection, being careful not to destroy natural camouflage around his position; he should save grass clumps, etc., for camouflage later on.

3. Individual should next dig in, making hole armpit deep. If he has a natural frontal parapet, the dirt from hole should be carried away and camouflaged; if not, the dirt should be used to make a frontal parapet.

4. Individual can now complete clearing fields of fire; he should clear only what is absolutely necessary. Insure that individual gets in firing position and checks observation in fields of fire.

5. Individual should next camouflage his position using available materials (e.g., grass clumps, foliage, etc.), blending the position with the surroundings. The camouflage should be checked by moving approximately 35 meters to front and observing the position; if the position can be spotted easily, more work on camouflage is needed.

6. After all of the above have been accomplished satisfactorily, the individual should construct overhead cover. He should use logs, planks, etc., which will support at least 12 inches of dirt, and dig a cave-like area big enough to get under.\*

7. Upon completion of the overhead cover, the individual should begin to improve his position. Items to check for include grenade sump, drainage trench, elbow holes, night firing stakes, range card, and improvement of camouflage.

#### REFERENCE:

None

**TASK NUMBER: 051-202-1001**

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**CAMOUFLAGE/CONCEAL SELF  
AND INDIVIDUAL EQUIPMENT**

---

**CONDITIONS:**

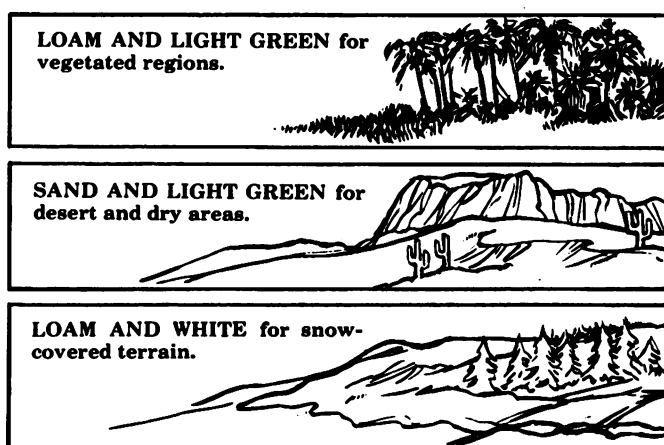
During daylight, given camouflage paint stick(s), individual weapon, load-bearing equipment (LBE), helmet complete with accessories, a snowsuit (white sheet or mattress cover) if appropriate, burlap garnishing strips or cloth strips, charcoal or burnt cloth residue, and mud (if appropriate to area).

**STANDARDS:**

Within 15 minutes, shade shiny areas of exposed skin with dark color and shadow areas with light color. Clothing, LBE, and weapon outlines will be altered and irregular patterns added to blend with the predominant color of the background in the area.

**PERFORMANCE MEASURES:**

1. **Guide for skin camouflage** (figure 1). Exposed skin reflects light and attracts the enemy's attention. Even very dark skin will reflect light because of its natural oil. Camouflage face paint sticks are issued in three standard two-tone sticks as follows:



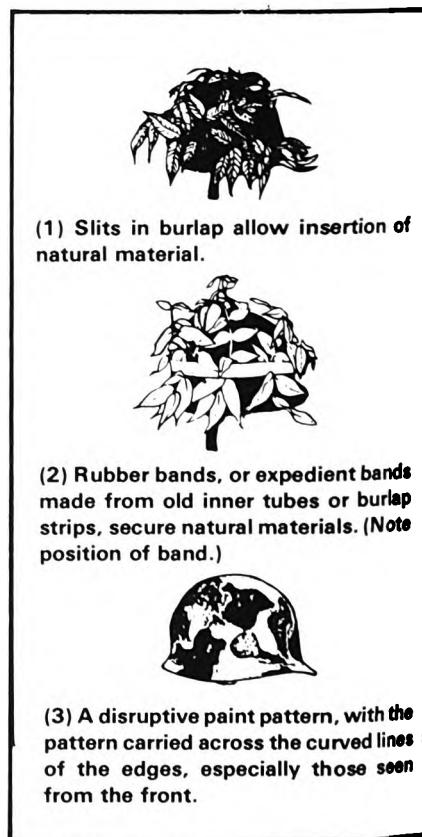
*Figure 1.*

**2. To camouflage exposed skin (figure 2):**

- a. Paint the shiny areas (forehead, cheekbones, nose, and chin) with a dark color.
- b. Paint the shadow areas (around the eyes, under the nose, and under the chin) with a light color.
- c. Paint the exposed skin on the back of your neck and hands with irregular patterns.
- d. When applying camouflage, use the buddy system -- work with another man and check each other.



*Figure 2.*



*Figure 3.*

**3. To camouflage the helmet (figure 3):**

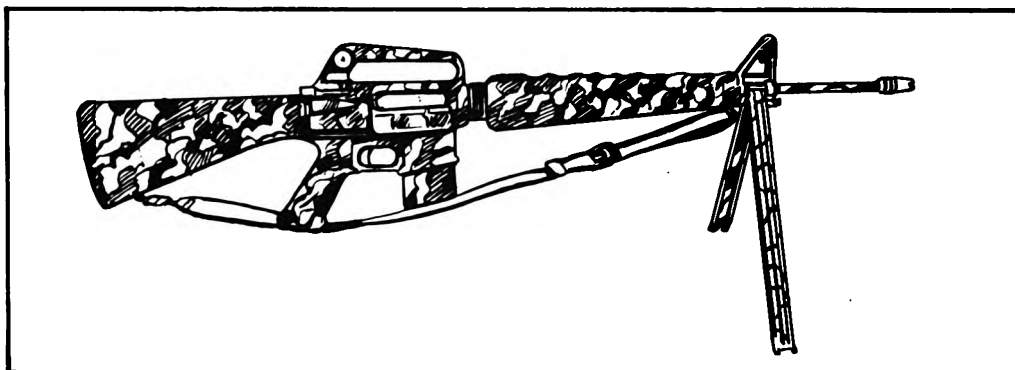
- a. The outline of the helmet is one of the striking features of your equipment, and its curved shape can be easily identified by the enemy. You should attempt to break up the outline of your helmet. There are several ways of doing this. Figure 3 shows some examples.
- b. Improvised helmet covers can be made of pieces of burlap, cloth, or sandbags.

#### 4. To camouflage your weapon (figure 4):

a. One of the easiest ways to change the outline of your weapon is by wrapping it with burlap strips or strips of cloth dyed to match the background.

b. Pattern painting the weapon is also good. Shiny parts can be covered by cloth, paint, or mud.

c. Care must be taken when camouflaging a weapon not to cause interference in the sighting and firing of the weapon.



*Figure 4.*

#### 5. To camouflage your uniform:

a. Combat uniforms can be stained and dyed with a little imagination.

(1) You can make a uniform blend with the terrain by dyeing it or by attaching bow ties of colored burlap.

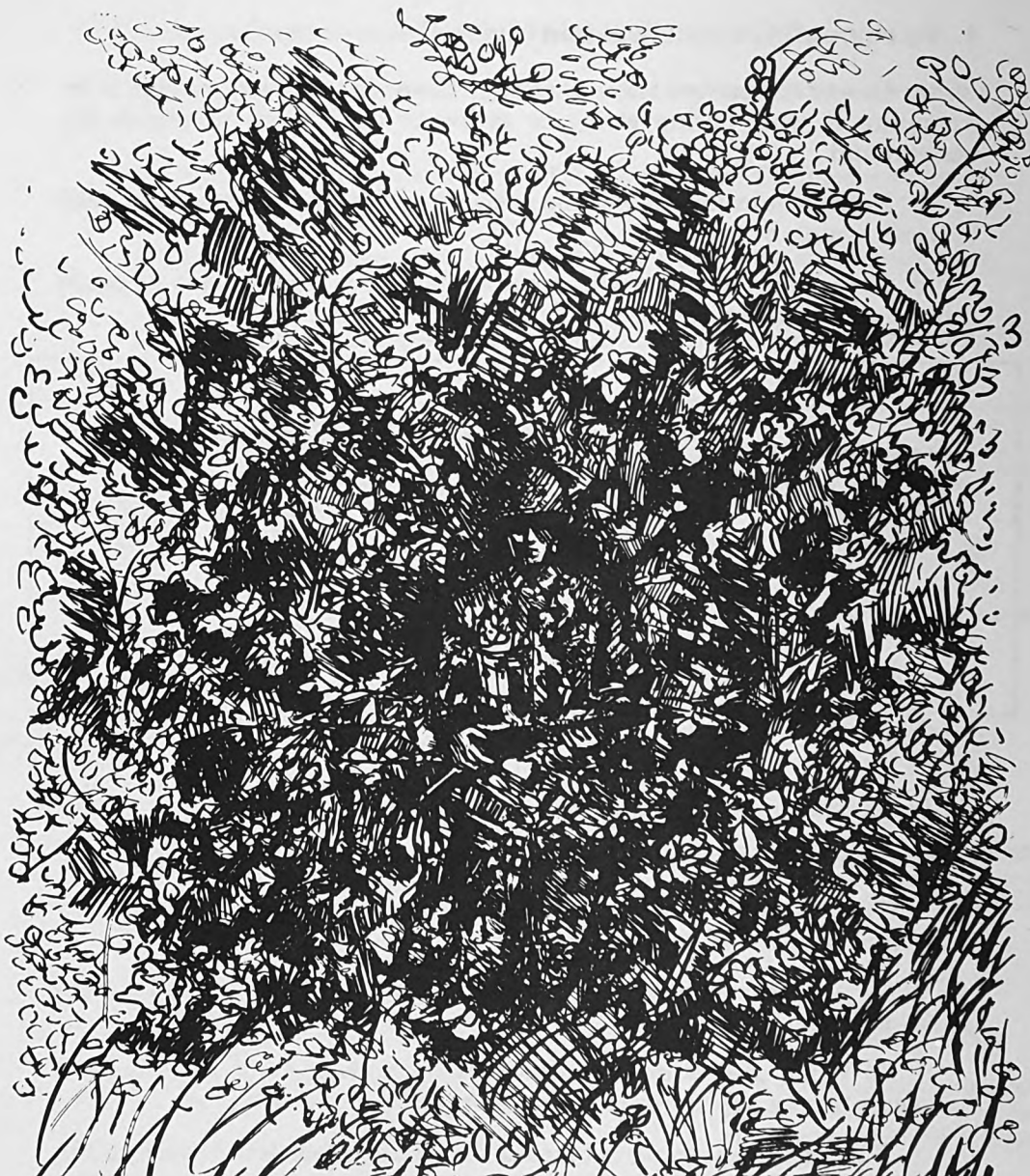
(2) A mixture of mud and grease or crankcase oil may be used to stain your uniform.

(3) When operating in snow-covered terrain, you can make a snowsuit from a sheet, mattress cover, or other white cloth.

b. The important thing is to make the clothing look less like a uniform and more like the terrain in which it is to be worn.

#### 6. To blend with your surroundings (figure 5):

Blending is the use of camouflage materials on, over, and around an object so that it appears to be part of the background. For example, a soldier can apply stick paint to exposed skin, and add burlap, paint, and live vegetation to his helmet, clothing, and LBE so that he will closely resemble or blend into the background.



*Figure 5.*

**REFERENCES:**

FM 5-20, Camouflage, May 68 (chap 4, pages 26 thru 30, para 11 thru 17)

TEC Lesson 937-061-0030-F, Cover, Camouflage, and Concealment, Part I



**TASK NUMBER: 051-202-1002**

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**CAMOUFLAGE/CONCEAL EQUIPMENT**

---

**CONDITIONS:**

During daylight, given an item(s) of military equipment in a field location, natural camouflage materials (foliage, grass, mud, snow, etc.) appropriate to area, camouflage net(s), and basic issue pioneer equipment.

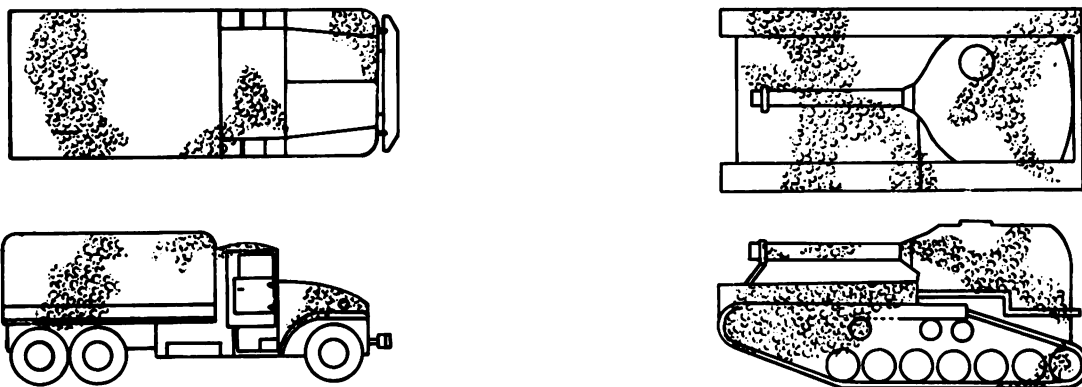
**STANDARDS:**

Conceal shiny parts and cover remaining areas of the equipment in irregular patterns, and alter outlines to blend with the predominant terrain background pattern in the area.

**PERFORMANCE MEASURES:**

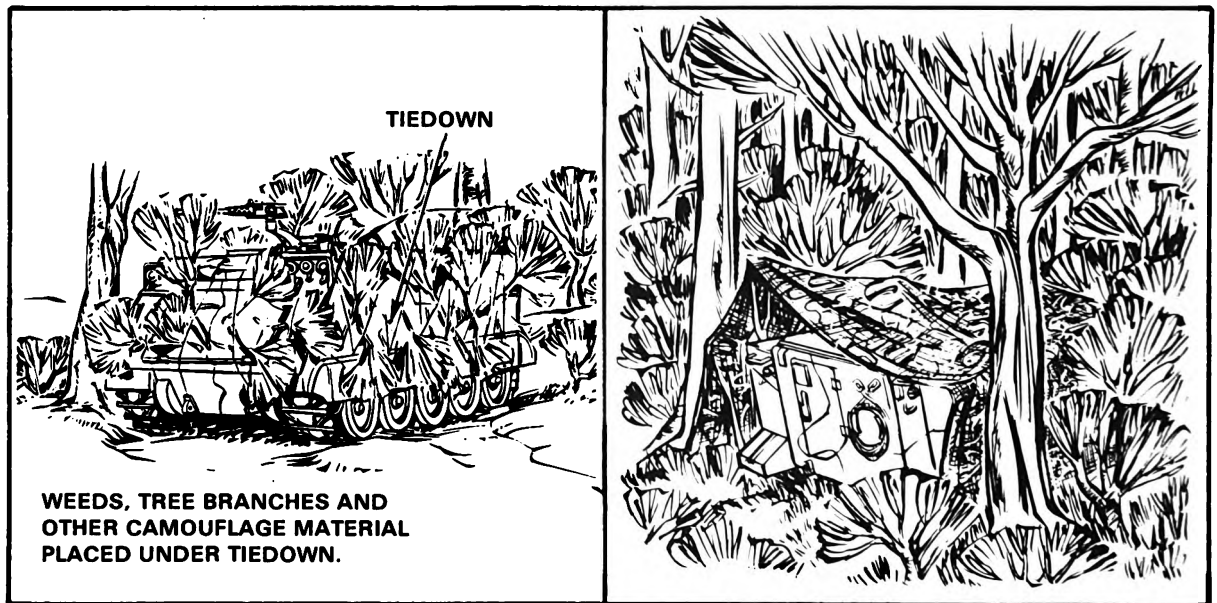
To camouflage and conceal equipment, follow these examples:

1. Use pattern paint, mud, etc., to cover shiny areas of equipment in irregular patterns so the item will blend with the color of natural surroundings (figure 1).



*Figure 1.*

2. Use natural materials (foliage, grass, mud, etc.) and manmade materials to alter the shape and size of the equipment (figure 2).



*Figure 2.*

**REFERENCES:**

**FM 5-20, Camouflage, May 68 (chap 6, page 36, para 24b and c)**

**FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77, (chap 9, pages 9-1 thru 9-12)**

**TEC Lesson 937-061-0030-F, Camouflage, Cover and Concealment, Part I**

**TEC Lesson 937-061-0032-F, Camouflage, Cover and Concealment, Part 3**

**TASK NUMBER: 051-202-1003****CAMOUFLAGE/CONCEAL DEFENSIVE POSITIONS****CONDITIONS:**

In a field location during daylight or limited visibility, given a defensive position either being built or already constructed.

**STANDARDS:**

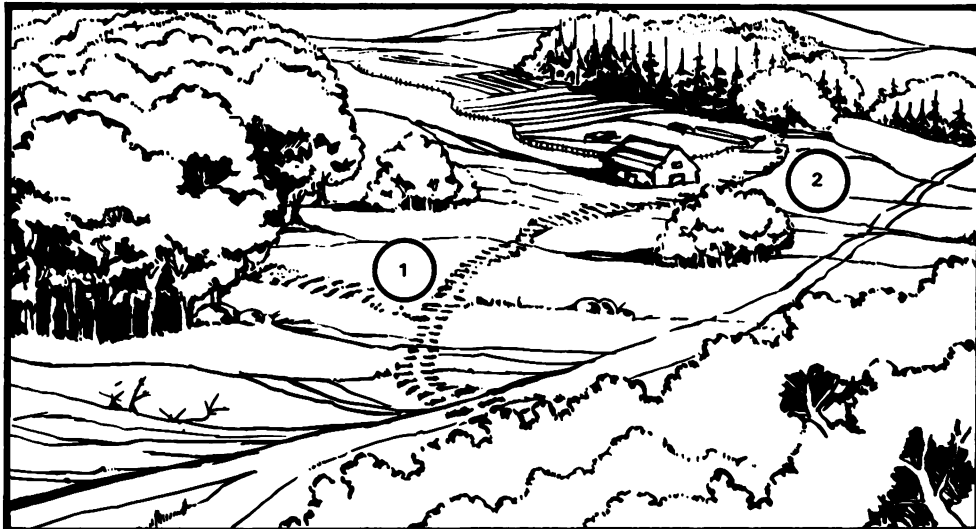
Completed position so blends with the terrain that an approaching soldier approximately 35 meters (handgrenade range) to the front cannot detect it.

**PERFORMANCE MEASURES:**

1. Before, during, and after construction of defensive position:

a. Approach the position only from the rear, insuring that a visible trail is not left. Circle the position when moving to the front so that a trail does not point out the position (figure 1).

b. Do not litter area, make noise, or, during hours of darkness, expose any light.



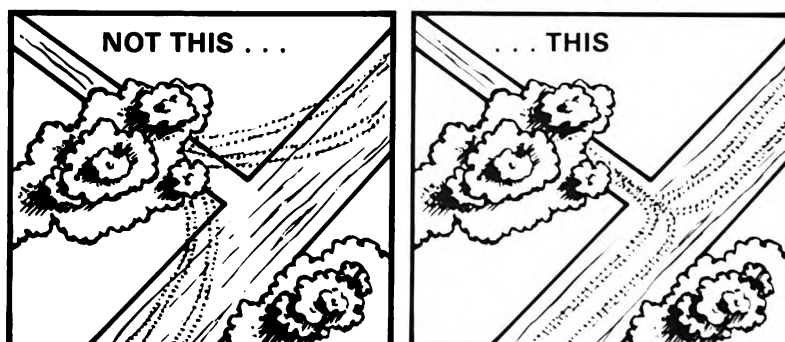
It is obvious here, to even the untrained observer, that some activity is taking place at both 1 and 2 and needs watching.

*Figure 1.*

2-II-B-3.1

- c. Do not disturb vegetation not used in constructing or camouflaging the position. Be particularly careful with a vehicle, if you are a driver, to insure that the vehicle does not leave a trail pointing out the position (figure 2).

### DON'T CUT CORNERS SHORT



Cut corners show vehicle movement into woods.

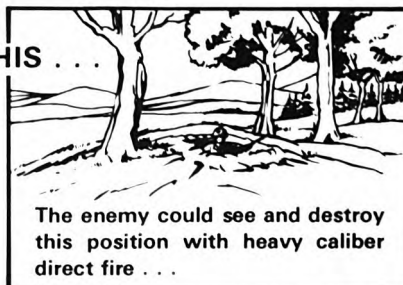
Figure 2.

#### 2. During construction:

- a. Place sod from the position in front of proposed parapet location.
- b. Use soil removed from the position to build a parapet and then cover it with sod in such a manner that it looks natural and will have a good chance of growing. Conceal the dirt you dig from the foxhole by carrying it away and putting it under low bushes, on roads, or in streams and ponds (figure 3). The poncho is handy for carrying soil.



NOT THIS ...



... THIS

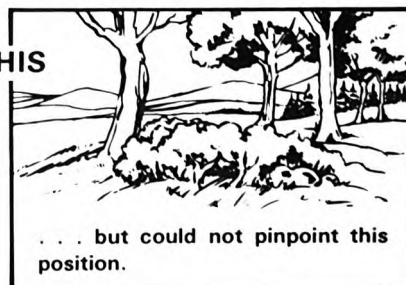


Figure 3.

2-II-B-3.2

c. If additional vegetation must be used to break up the outline of the parapet, obtain some (similar to that found near your position) from far to the rear of your position with root structure intact, if possible. Do not use so much vegetation that the position has more than the surrounding area. Camouflage the holes or cuts from which vegetation was removed.

3. After construction:

a. Replace dying foliage constantly. (Change cut foliage at least every 3 hours when the tactical situation permits.)

b. If the ground under the weapon's muzzle (when aimed within sector of fire from completed position) is dusty, keep it moist but not excessively wet.

c. Upon completion, your position should blend with the surrounding terrain to prevent detection from the front. You or your buddy should check the position from the front to insure sufficient concealment (figure 4).



*Figure 4.*

**REFERENCES:**

FM 5-15, Field Fortification, Jun 72 (chap 2, sec II, page 2-2)

FM 5-34, Engineer Field Data, Sep 76 (chap 16, page 361)

TEC Lesson 937-061-0032-F, Camouflage, Cover and Concealment, Part 3



**TASK NUMBER: 071-331-0801**

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**USE CHALLENGE AND PASSWORD**

---

**CONDITIONS:**

Given current challenge and password and a defensive position with designated sector of fire. Soldier will be told that enemy and friendly personnel may enter his sector and that he is to allow friendly personnel to pass only if they respond with correct password and to detain (capture) other personnel as he is able.

**STANDARDS:**

Soldier will:

1. Detect and halt personnel in his sector.
2. Challenge them using correct challenge.
  - a. If given correct password, allow personnel to pass.
  - b. If not given correct password, attempt to detain (capture) personnel as he is able.

**PERFORMANCE MEASURES:**

**IF ONE MAN DESIRES TO PASS:**

1. Seeing or hearing someone approach your position, before that person gets close enough to pose a threat, command the person to "Halt!" Use a clear voice, just loud enough to be heard.
2. Seeing the stranger halt, keep the stranger covered and without exposing your position, ask "Who is there?" Again, use a clear voice but just loud enough to be heard so the enemy won't overhear if he's nearby.
3. When the stranger identifies himself, such as "Private Willard, Messenger," you order him to "Advance to be recognized."

4. Maintain your concealed position and keep the stranger covered with your weapon. When the stranger gets within two or three meters of you, again order him to "Halt!"

5. Issue the challenge in a soft voice and wait for the stranger to reply with the correct password. Hearing the correct password, give permission to pass if you have no other reason for doubt. If doubt still exists, demand further identification or ask a question only a friendly person would be able to answer.

**IF A GROUP DESIRES TO PASS:**

6. The procedure and precautions for a group are almost the same as for one man. Seeing or hearing a group approach, before they are close enough to pose a threat, order them to "Halt!"

7. The leader of the group should identify the group, such as "Friendly Patrol." Since you don't want the whole group to advance on you at once, order "Advance one man to be recognized."

8. When the leader has come forward to be recognized give him the challenge and get the password in reply.

9. Once you're satisfied that the leader is friendly, have the rest of the patrol advance one by one and let the leader identify each man.

10. Person(s) not able to give the proper password or identify himself to your satisfaction is disarmed and detained. Then notify your immediate superior.

**REFERENCES:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**FM 22-6, Guard Duty, C1, Sep 71 (chap 9, pages 9-1 and 9-2; app F, pages F-1 to F-4)**

**TEC Lesson 935-071-1029-F, Counterintelligence**



## TASK NUMBER: 071-331-0802

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**PROCESS KNOWN OR SUSPECTED ENEMY PERSONNEL**

---

**CONDITIONS:**

Given an area with friendly civilians and other friendly elements, two surrendering enemy personnel with weapons (rifles, bayonets, pistols, etc.) and military documents, a designated prisoner of war (PW) collection point 200 meters to the rear, and PW tags.

**STANDARDS:**

Within 15 minutes, without letting the prisoners talk to each other, and without letting anyone harm them, remove all weapons and documents except individual ID papers; tag prisoners and their equipment with your complete unit ID, date, time, and circumstances of capture; and turn the prisoners' weapons and documents over to the collection point.

**PERFORMANCE MEASURES:**

Suspected or known enemy personnel must be handled under the following rules:

1. **SEARCH prisoners** (figure 1) for weapons and documents as soon as you capture them. Take weapons to prevent resistance and take documents, except individual identification papers, to prevent the prisoners from destroying them. Prisoners from whom personal property is taken, including personal documents, should be given a written receipt for the property. Tag documents and personal property taken so you know which prisoner had them. Allow prisoners to keep items needed for their general welfare or safety such as a protective mask.



Figure 1.

2-II-C-2.1

2. **SEGREGATE** them into groups (figure 2): officers, noncommissioned officers, privates, deserters, civilians, females, and political indoctrination personnel. This prevents the leaders from organizing for a mass escape and from making the rest of the prisoners security-minded.



*Figure 2.*

3. **SILENCE** (figure 3) is essential. Do not allow prisoners to talk to each other. This helps to prevent plans of escape.



*Figure 3.*

4. **SPEED** (figure 4) prisoners to the rear. The information they have does no good until obtained by an interrogator and processed.



*Figure 4.*

2-II-C-2.2

5. **SAFEGUARD** the prisoners (figure 5) as you take them to the rear. Do not allow anyone to abuse them and do not allow anyone to give them cigarettes, food, or water.

### SAFEGUARD



*Figure 5.*

6. **TAGGING.** A PW tag should include the capturing unit (a complete unit identification), date and time of capture, place of capture (grid coordinates or reference from a known point), and circumstances of capture (how PW was captured). The same format is used for documents and equipment except that circumstances identify where documents or equipment came from (i.e., from PW Ivan Schmidt, "found on dead enemy soldier", etc.) (figure 6).

**NOTE:** Tags may be printed before combat or made out of materials at hand on the battlefield.

	TYPE DOCUMENT/EQUIPMENT _____
	DATE/TIME CAPTURED _____
	PLACE OF CAPTURE (GRID COORDINATES) _____
	CAPTURING UNIT _____
	CIRCUMSTANCES OF CAPTURE (HOW IT HAPPENED) _____

*Figure 6.*

### REFERENCES:

FM 21-75, Combat Training of the Individual Soldier and Patrolling

TEC Lesson 935-071-1028-F, Processing Captured Personnel, Equipment, and Documents



**TASK NUMBER: 071-331-0803**

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**COLLECT/REPORT INFORMATION - SALUTE**

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**CONDITIONS:**

Given a tactical situation which includes any number of enemy soldiers, engaged in any type of activity, who can be seen either with the naked eye or with binoculars.

**STANDARDS:**

Give an oral report to your leader which describes each point of interest expressed by the letters of the key word SALUTE. (Location may be descriptive; need not be grid coordinates.)

**PERFORMANCE MEASURES:**

1. Report all information quickly, completely, and accurately. The example report below shows how much detail is included in a complete report.

"Seven men in civilian clothes, one carrying rifle and bandoleer, six carrying farm tools, entered the village of Friedberg (BN 223227) by SW gate at 211300 August. Same seven men, all with rifles and bandoleers, left Friedberg by NE gate 211400 August, walking NE on road to Ogau (BN 214230)."

2. A good way to remember how and what to report about the enemy is to use the letters of the word SALUTE.

- a. **S - IZE** - The number of personnel seen or size of object.
- b. **A - CTIVITY** - What the enemy was doing.
- c. **L - OCATION** - Grid coordinates or reference from a known point including distance and direction (or azimuth) from the known point.
- d. **U - NIT** - Describe any patches or clothing, distinctive signs or symbols, or ID numbers on vehicles.
- e. **T - IME** - The time the activity was observed.
- f. **E - QUIPMENT** - Describe or identify all equipment associated with the activity.

3. Both oral and written reports may be accompanied by maps, photos, overlays, sketches, captured documents, enemy materiel, or anything else which may help convey the full meaning of the information you are reporting.

**REFERENCES:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 935-071-1026-F, Collecting and Recording Information**

**TASK NUMBER: 071-331-0804**

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**CONDUCT DAY AND NIGHT SURVEILLANCE WITHOUT  
THE AID OF ELECTRONIC DEVICES**

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**CONDITIONS:**

1. **Situation 1:** During daylight, with good visibility to 500 meters or beyond, given an unspecified number of:

a. Improperly camouflaged OPFOR soldiers in fighting positions and temporary battlefield positions at ranges from 30 to 460 meters.

b. Stationary, properly camouflaged vehicles at ranges from 150 to 500 meters.

2. **Situation 2:** At night, with good visibility to 500 meters or beyond, given an unspecified number of:

a. Moving and stationary OPFOR soldiers skylined at not more than 300 meters.

b. Moving and stationary OPFOR soldiers in open and semi-open areas, not on the skyline, at ranges less than 100 meters.

c. Sounds of wheeled and tracked vehicle movement.

d. Sounds of friendly and enemy weapons fire.

**STANDARDS:**

1. **Situation 1:** Locate 75 percent of all soldiers (positions) and 50 percent of all vehicles.

2. **Situation 2:** Locate 75 percent of soldiers on skyline, locate 50 percent of all soldiers not skylined, differentiate between tracked and wheeled vehicle sounds, and identify all weapons fire as:

a. Heavy machinegun fire.

b. Light machinegun/assault rifle fire.

c. Indirect fire.

d. Rocket/recoilless rifle fire.

**PERFORMANCE MEASURES:**

1. To conduct a visual search in daylight:





- e. Piles of dirt and litter, tracks, and footpaths.
  - f. Failure to observe selective clearing procedures.
3. To conduct surveillance at night:
- a. Dark adaptation. Accustom eyes to low levels of illumination prior to night operations by either:
    - (1) Staying in a secure darkened area for 30 minutes (assembly area at night, initial rally point (IRP), etc.).
    - (2) Staying in a red-lighted area for 20 minutes followed by 10 minutes in darkness.
    - (3) Wearing red goggles for 20 minutes followed by 10 minutes in darkness.
  - b. Scanning. To visually search areas at night, move your eyes in short, quick, irregular movements (figure 3).

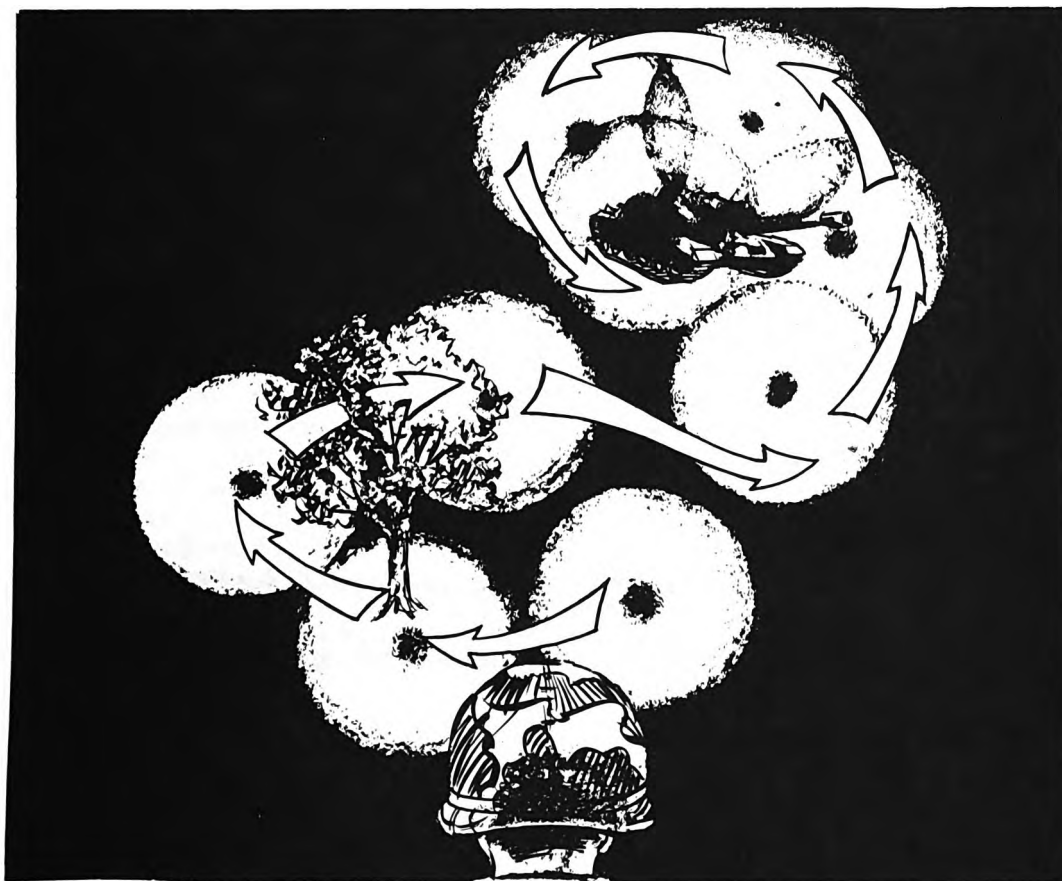
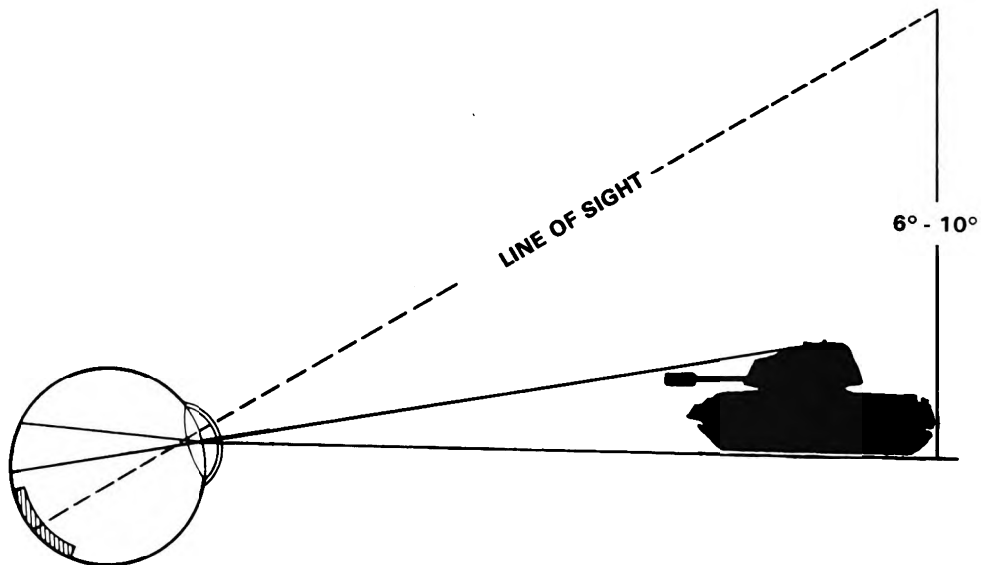


Figure 3.

c. Off-center vision. To observe specific objects, look slightly to the left, right, above, or below them, by about 6 to 10 degrees (figure 4).



*Figure 4.*

d. Preserving night vision. When exposed to bright lights, close both eyes. If surveillance must be maintained, close one eye only and observe with the other.

**TRAINING TIPS:** Since it is hard to tell if the above techniques are being used, frequent training is the only way to insure mastery of this skill. The nature of this task makes it easy to integrate with other tactical training. Maintaining surveillance is one of the basic and critical combat skills. In addition to the training given above, frequent familiarization with the sounds of vehicles and weapons fire, and with various common smells such as gasoline, campfires, deodorants, etc., in a field environment is recommended.

#### **REFERENCE:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 020-171-1614-F, Target Acquisition Scanning Techniques**

**TASK NUMBER: 071-331-0806**

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**IDENTIFY OPPOSING FORCES (OPFOR)  
ARMORED VEHICLES**

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**CONDITIONS:**

During a field training exercise or in a classroom or suitable area in garrison, given a mockup, model, or photograph of opposing force (OPFOR) vehicles.

**STANDARDS:**

Identify each vehicle observed by NATO nomenclature and state primary combat role of each.

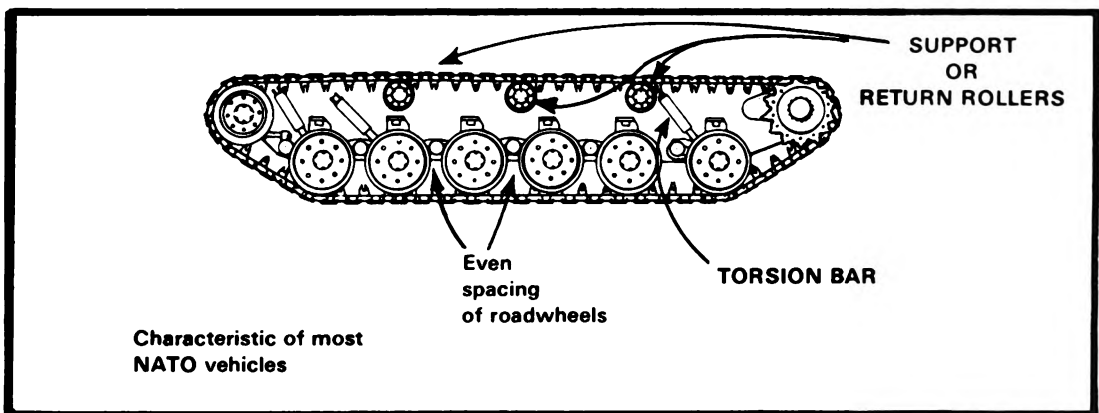
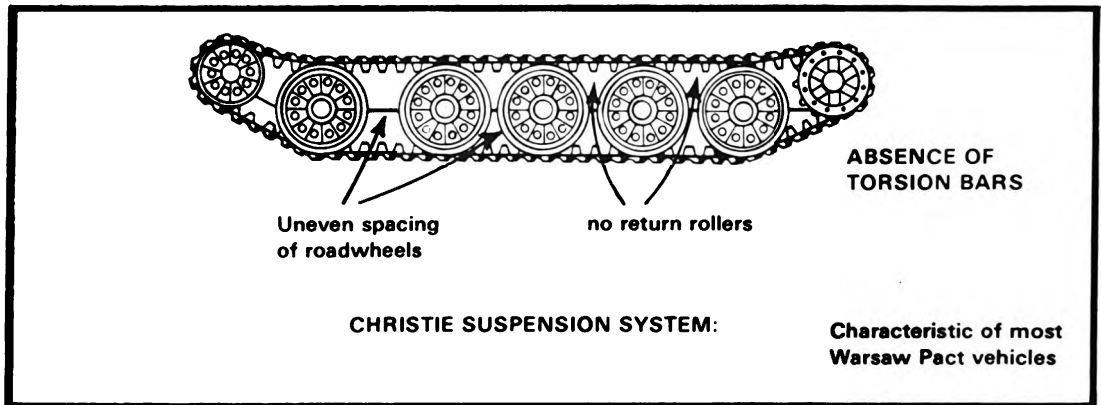
**PERFORMANCE MEASURES:****Tank Characteristics.**

1. Identification. Tank identification is designed around four areas common to all tanks.

- a. Track and suspension system.
- b. Turret.
- c. Main gun.
- d. Cupola.

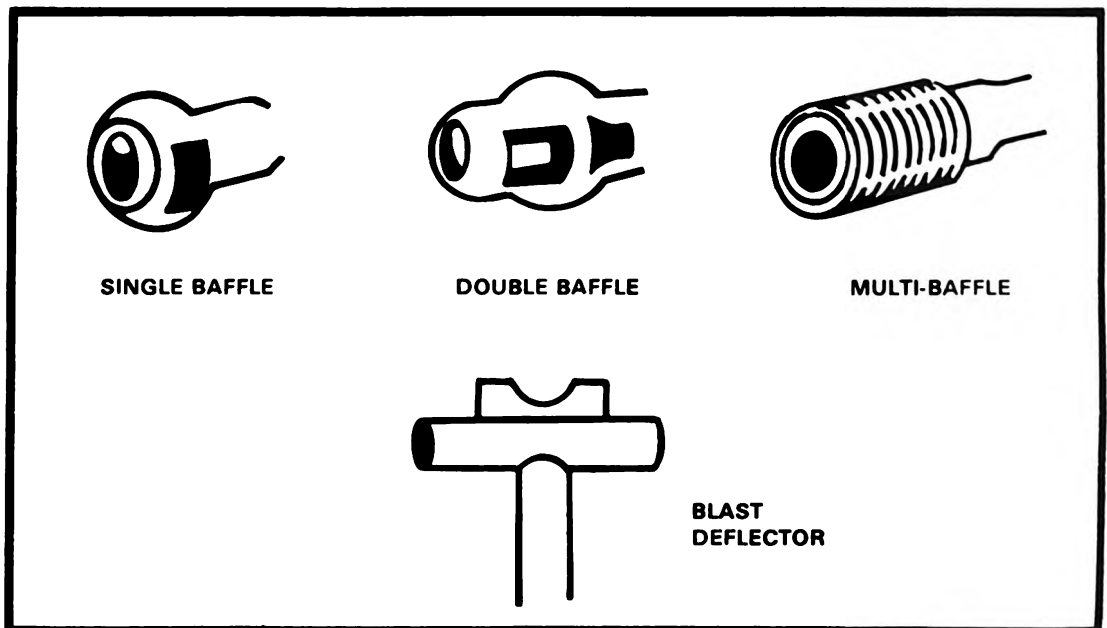
2. Track and Suspension System. Many tanks may be recognized by their track and suspension systems. However, recognition by this feature alone is often difficult as the tracks will often be obscured by grass or other objects. To identify the track and suspension system, check to see if it has support or return rollers. Except for the T-10, M1970, and T-72 tanks, most Warsaw Pact vehicles do not have these rollers.

**NOTE:** When using this method to help identify tanks, keep in mind that the M551, Sheridan in the US Army also has no return rollers.

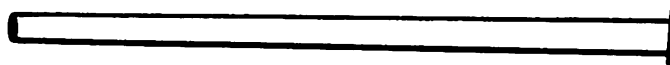


3. Main Gun. Armament varies from machineguns to large cannons. In turreted vehicles, the heaviest armament is normally in the turret. Look for:

a. Muzzle brakes.



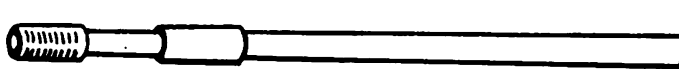
## b. Main gun bore evacuator and its location.



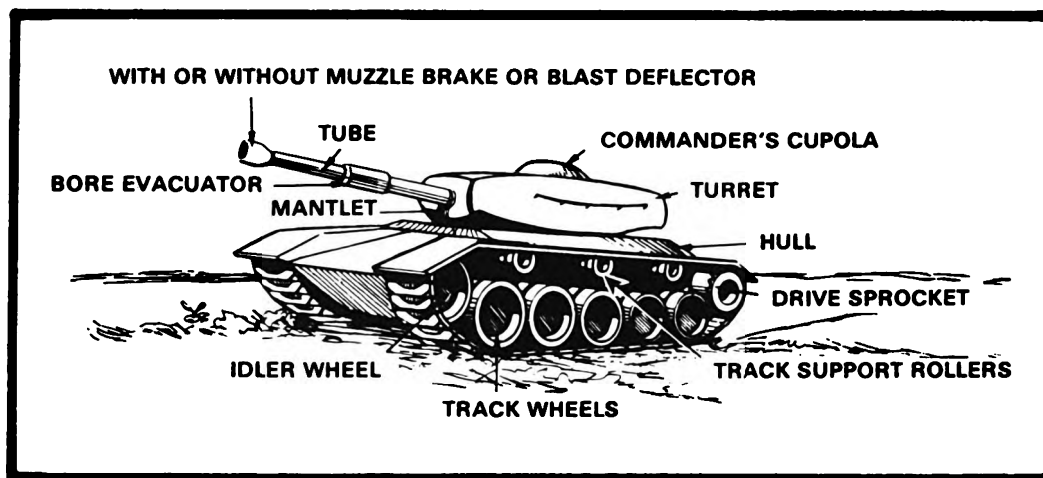
MAIN GUN WITHOUT BORE EVACUATOR



MAIN GUN WITH BORE EVACUATOR

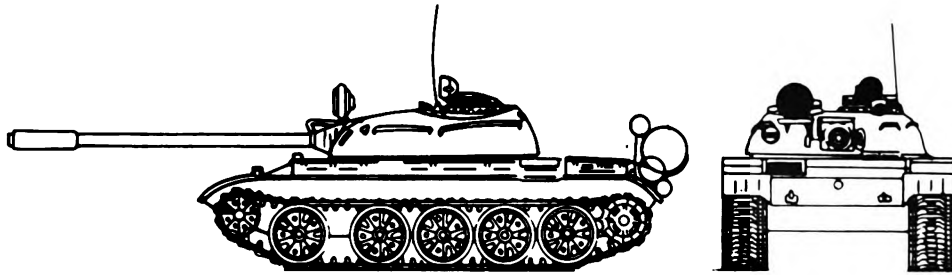
MAIN GUN WITH BORE EVACUATOR AND  
MUZZLE BRAKE/BLAST DEFLECTOR

Note these common identification characteristics of both friendly and threat tanks:



**Tanks.** Threat main battle tanks are smaller than the US main battle tank. They have a cruising range of about 300 miles without auxiliary fuel and can attain speeds of about 30 mph. Threat tank fire control is relatively simple compared to that of US tanks. Currently, they mount no rangefinder similar to those on US tanks. Most Threat main battle tanks are equipped with active infrared (IR) night viewing devices, and have a superior underwater snorkeling capability.

**NATO Nomenclature: T-55 Tank**



**Recognition features:** Fully tracked; five-roadwheeled; space between first and second roadwheels; low-silouetted, sloped hull; dome-shaped turret mounted over third roadwheel; bore evacuator at muzzle; infrared headlights; infrared searchlight for gun; seven variations of this model exist.\*

**Main gun range.** 1,500 meters.

**Speed:** 50 km/hr.

**Range:** 500 km.

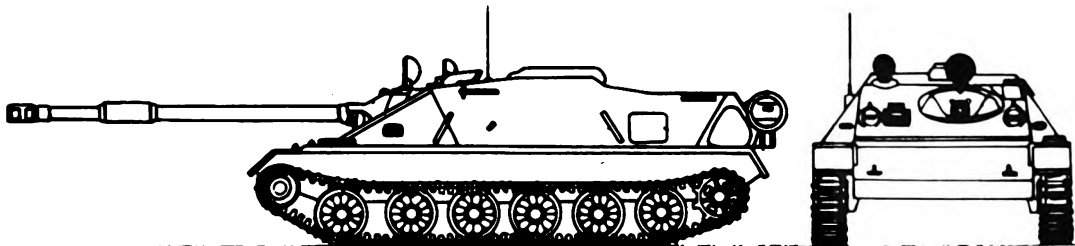
**Users:** India, Israel (with 105-mm gun), People's Republic of China, United Arab Republic, USSR, Warsaw Pact.

**Employment:** Medium battle tank in armored formations.

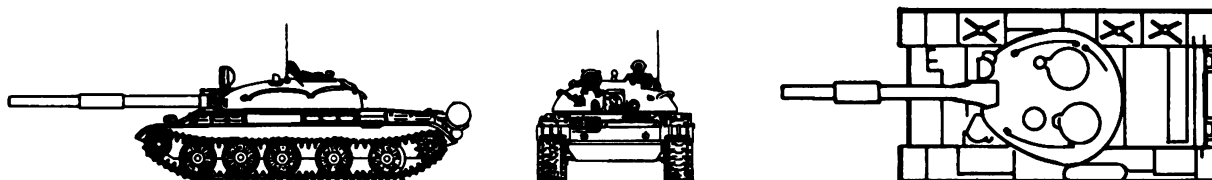
\*T-55 and T-55A may mount 12.7-mm AA machinegun.

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**NATO Nomenclature: ASU-85**



The ASU-85 airborne assault gun provides armored striking power to airborne forces. Although not amphibious, the ASU-85 chassis is based on that of the PT-76 tank. Its armament is an 85-mm main gun and a 7.62-mm coaxial machinegun. The ASU-85 mounts a large gunner's infrared searchlight above the mantlet and carries a small commander's light.

**NATO Nomenclature: T-62 Tank**

**Recognition features:** Fully tracked; five-roadwheeled; flat, low-silhouetted hull; dish-shaped turret over third roadwheel; no muzzle brake; bore evacuator three-fourths to muzzle.

**Armament:** 1 — 115-mm main gun.  
1 — 7.62-mm machinegun (coaxial).  
1 — 12.7-mm AA machinegun.

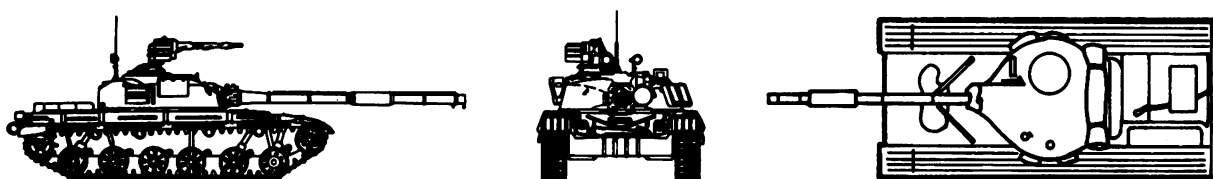
**Main gun range:** 2,000 meters.

**Speed:** 50 km/hr.

**Range:** 500 km.

**Users:** United Arab Republic, USSR, Warsaw Pact.

**Employment.** Main battle tank (medium) in armored formations.

**NATO Nomenclature: T-64 Medium Tank.**

**Recognition features:** Live track, complete with support rollers, centerguides, end connectors, and probable torsion bar suspension. Glacis plate is gently sloping and has a "V" shaped splash guard directly in front of driver's position; external fuel cells down both sides of tank; three equal size storage boxes on lefthand side of the turret, and two unequal size storage boxes on the righthand side of the turret. Main gun has bore evacuator about one-third down the gun tube from the muzzle end.

**Armament:** 1 — 125-mm main gun.  
1 — 12.7-mm AA machinegun (turret roof-mounted)  
1 — 7.62-mm machinegun (coaxial)

**Main gun range:** 2,000 meters (approximately).

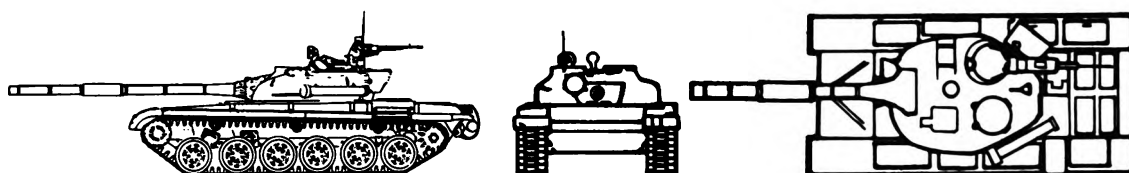
**Speed:** 55 km/hr.

**Range:** 500 km (approximately).

**Users:** USSR.

**Employment:** Main battle tank in armored formations.

**NATO Nomenclature: T-72 Medium Tank.**



**Recognition features:** Six evenly spaced roadwheels; 3 support rollers; turret is round at the front but egg-shaped in the rear. The infrared (IR) searchlight is on the right of the gun; bore evacuator first third of turret near muzzle.

**Armament:**

- 1 — 125-mm gun
- 1 — 7.62-mm machinegun coaxial)
- 1 — 12.7-mm AA machinegun  
(turret mounted)

**Speed:** 55 km/hr (approximately)

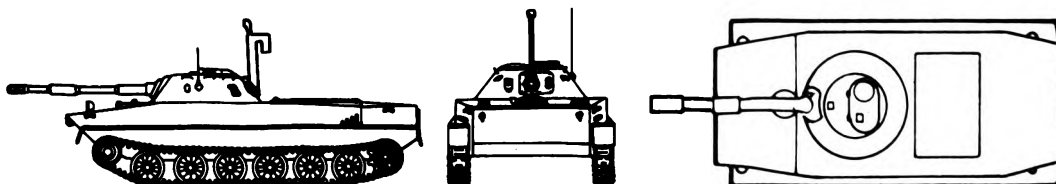
**Range:** 500 km (approximately)

**Users:** USSR

**Main gun range:** 2,000 meters

**Employment:** Armored formations.

**NATO Nomenclature: PT-76 Amphibious Tank.**



**Recognition features:** Fully tracked; six-roadwheeled; rectangular-shaped hull with a boat-like front; dish-type turret mounted over second roadwheel; chassis similar to BTR-50P; muzzle brake on main gun; bore evacuator close to muzzle.

- Armament:**
- 1 — 75-mm main gun
  - 1 — 7.62-mm machinegun (coaxial)
  - 1 — 12.7-mm machinegun (AA) (on some versions)

**Speed:** 45 km/hr — land  
10 km/hr — water

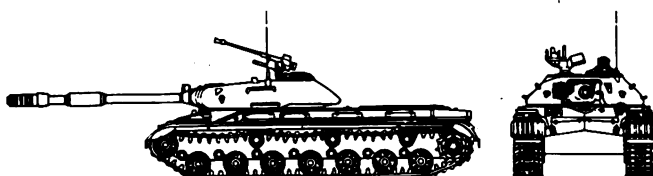
**Range:** 250 km

**Main gun range:** 1,000 meters

**Users:** People's Republic of China, United Arab Republic, USSR, Warsaw Pact.

**Employment:** Amphibious reconnaissance tank; personnel movement (up to six plus crew) in maneuver divisions and regiments.

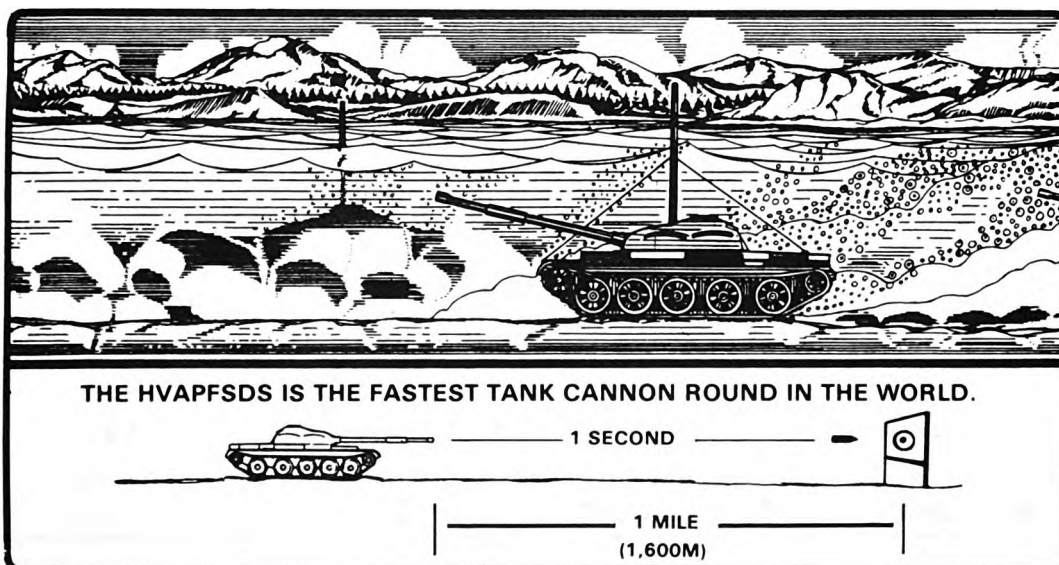


**NATO Nomenclature: T-10**

The T-10 heavy tank is rarely seen in Threat forward areas. This tank stays in the rear and is used in counterattacks or with tank killer units. It is equipped with infrared sights or devices for all crew members, and has seven pairs of roadwheels. Its primary weapon is a 122-mm stabilized gun firing kinetic energy armor-piercing cap and chemical energy high explosive antitank ammunition. It has two 12.7-mm machineguns, one for anti-aircraft and other mounted coaxially with the main gun.

**Strengths:** The strengths of Threat main battle tanks are:

- Low silhouette, which makes them harder to hit.
- Simple fire control, which makes them easier to operate and maintain.
- Infrared night vision devices, which increase effectiveness at night.
- Underwater snorkeling, which permits them to cross water barriers quickly.
- The high-velocity 115-mm APFSDS tank-defeating round, which travels a mile every second. The accuracy of this round gives T-62 tank crews a 50% chance of hitting a stationary target in the open with the first round at ranges to 1,500m, or a moving target traveling at a constant speed in the open at ranges to 1,000m.



**Weaknesses.** The weaknesses of Threat main battle tanks are:

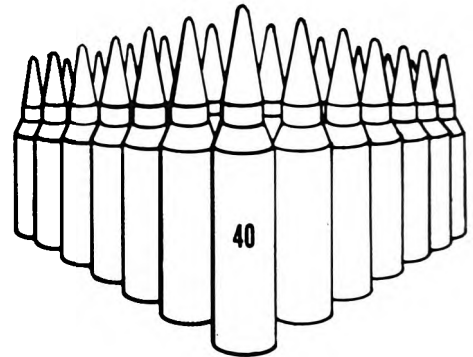
■ Threat tank fighting compartments are considerably smaller than those in US tanks. The crew is cramped and freedom to move is restricted. Crew fatigue can therefore be a bigger factor in Threat tanks.

■ Small turret interior and larger (115-mm) main gun ammunition means that Threat tanks have a slower rate of fire than US tanks.

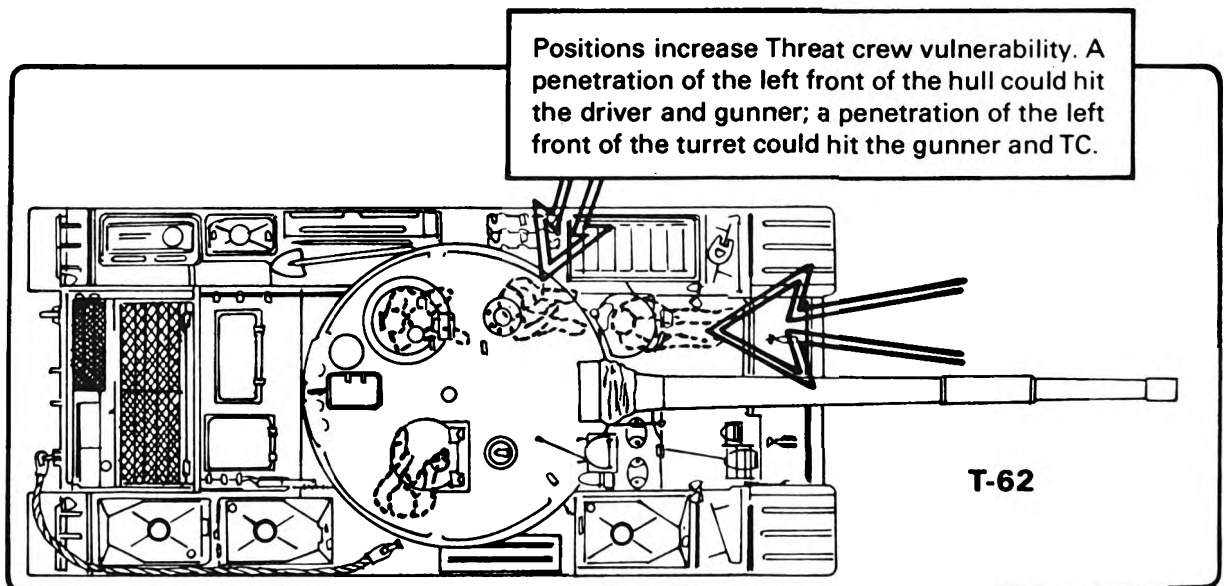
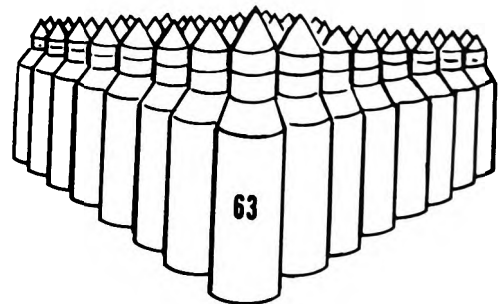
■ Because of its small fighting compartment, the T-62 tank has 23 fewer rounds of main gun ammunition than the M60A1. Therefore, in tank duels Threat tanks may run out of ammunition sooner than US tanks.

■ Some main gun ammunition is strapped along the turret walls, and hits above the turret ring may cause secondary ammunition explosions.

T-62

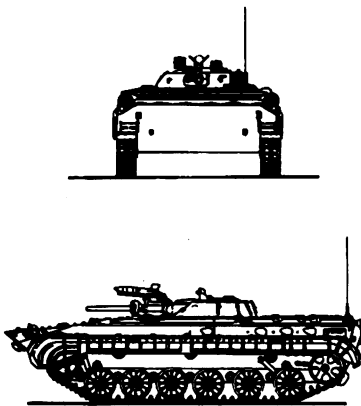


M60A1



## INFANTRY COMBAT VEHICLES

### NATO Nomenclature: BMP



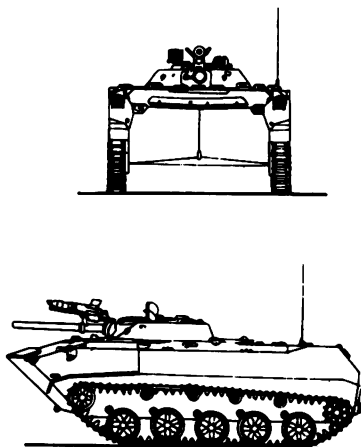
The amphibious BMP is used as both a reconnaissance and an armored fighting vehicle. The armored infantry version of the BMP has a crew of three — gunner, driver, and vehicle commander and has a rear compartment troop capacity of eight. There are four periscopes and firing ports on each side allowing the infantry to fire from inside the vehicle while on the move. Its main armament is a 73-mm smoothbore gun with a Sagger missile rail mounted over the gun. A 7.62-mm PKT coaxial machinegun is mounted on the turret. Each BMP has racks for two Sagger missiles.

**Recognition features:** Six-roadwheeled, tracked, amphibious, ICV; engine in front; two doors in rear; four hatches in top of crew compartment; low silhouette with flat revolving turret. (May have Sagger mounted above gun.)

**Employment:** Motorized rifle units.

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### NATO Nomenclature: BMD



The airborne amphibious combat vehicle, BMD, resembles the BMP. It has five evenly spaced roadwheels on each side and is 5m long. It is air droppable, carries six troops, and has a turret similar to the BMP with a 73-mm gun and a Sagger missile launch rail. The BMD is amphibious and has a water propulsion system similar to the PT-76.

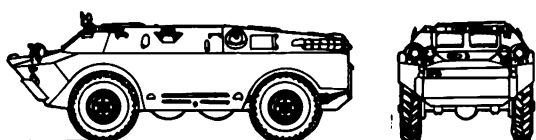
**Recognition features:** Five evenly spaced roadwheels; turret mounts the same as on the BMP; rear crew compartment, amphibious.

**Employment:** Motorized rifle units.

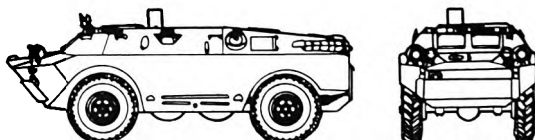
## SCOUT VEHICLES

## NATO Nomenclature: BRDM-2

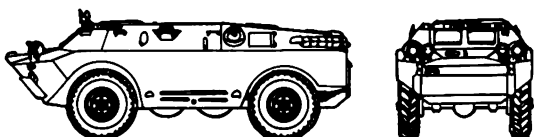
The BRDM-2 is a four-wheel-drive amphibious scout car adaptable for many uses on the battlefield. It can be used as a command vehicle, an NBC test vehicle, an antiarmor vehicle, or an ADA vehicle. Cross-country mobility is improved by a centralized tire pressure regulation system, and by four retractable auxiliary drive wheels located under the center of the vehicle which can be lowered to aid flotation and help in crossing gaps. The rear mounted power plant is improved over that of the first BRDM's. Its armament is a turret-mounted 14.7-mm machinegun. Its armament in the basic reconnaissance car is two machineguns mounted on the turret.



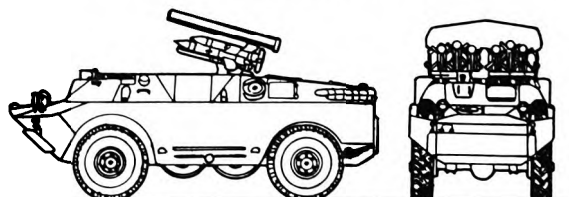
BRDM-2



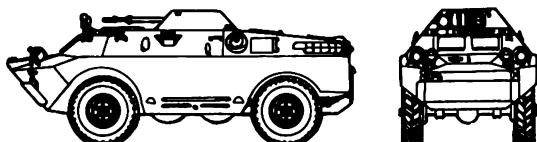
Chemical reconnaissance vehicle



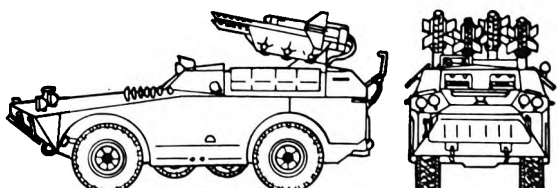
Command vehicle



ATGM launcher



Reconnaissance car

Anti-aircraft missile  
launcher

**Recognition features:** Four-wheeled, amphibious, armored reconnaissance vehicle; has full armored cover; has four small, rough terrain belly wheels that may be raised or lowered when needed.

**Employment:** As scout car in different variants; can mount Snapper, Swatter, or Sagger AT missiles. Two versions: basic BRDM has a 7.62-mm machinegun; BRDM-2 has a 14.5-mm machinegun.

## REFERENCES:

FM 71-1, The Tank and Mechanized Infantry Company Team, Jun 77 (chap 2, pages 2-1 thru 2-12)

TC 30-3, Soviet Equipment Recognition Guide, Apr 75 (pages 25 thru 44)

**TASK NUMBER: 071-331-0808**

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**IDENTIFY OPPOSING FORCE (OPFOR)  
WEAPONS AND EQUIPMENT**

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**CONDITIONS:**

Given a mockup, model, or photograph of OPFOR and NATO weapons and equipment.

**STANDARDS:**

Identify each weapon and piece of equipment by NATO nomenclature and as being friendly or Threat.

**PERFORMANCE MEASURES:**

1. Threat small arms are characterized by their heavy weight and high reliability. Emphasis is placed on simplicity of design for easy training, handling, and maintenance. Their automatic weapons are generally shorter than U.S. models for use from inside APCs.
2. The standard Threat side arm is the 9-mm Makarov Semi-Automatic Pistol (pm), which uses an eight-round magazine (figure 1).



**Characteristics:**

Length: 106 mm  
Weight: 0.81 kg  
Effective Range: 50 m  
Magazine Capacity: 8 rounds

**Identifying features:** Star on butt; weapon has a double-action trigger.

*Figure 1.*

## THREAT RIFLES AND MACHINEGUNS

### 1. Rifles:

- a. AKM - 7.62-mm assault rifle  
NATO Nomenclature: AK (Knashnikov)

Identifying features: Gas cylinder above the barrel.



- b. AKMs - This new version has a folding stock:

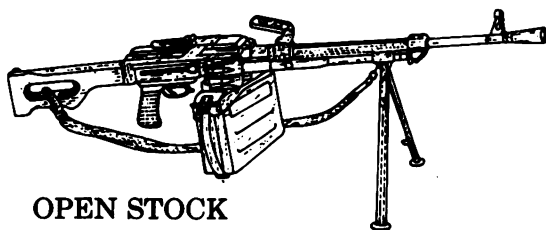


**NOTE:** Characteristics and identifying features same as AKM except for folding stock.

### 2. PK Series 7.62 General Purpose Machinegun:

**NOTE:** This machinegun appears in two versions.

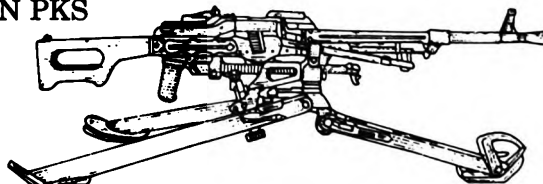
- a. The bipod-mounted PKM used at the squad or company level.



OPEN STOCK

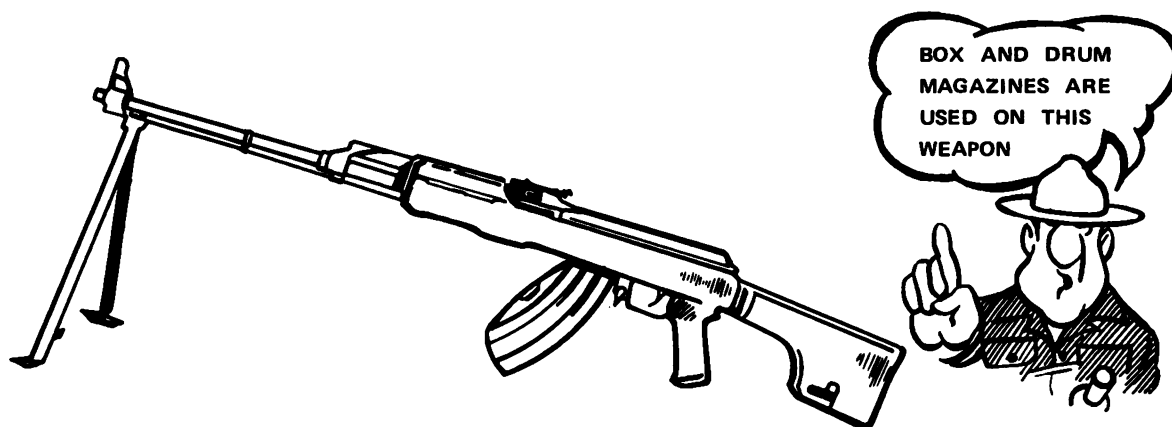
NATO Nomenclature:  
PKM general purpose machinegun

GAS CYLINDER  
BELOW BARREL  
ON PKS



- b. The tripod-mounted PKS used as an  
AA weapon.

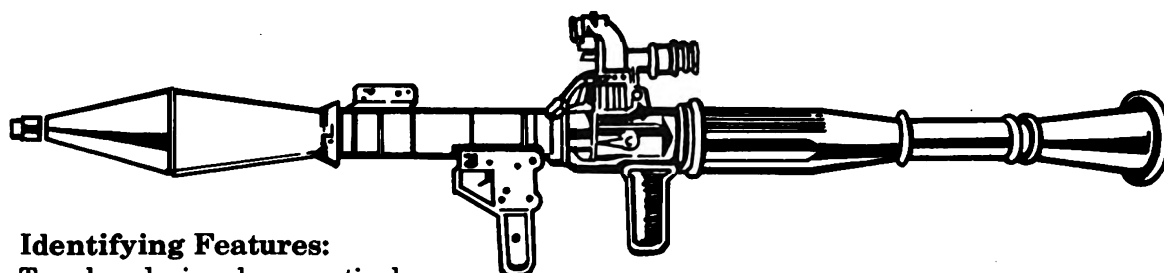
NATO Nomenclature: RPK 7.62-mm Light Machinegun



### ANTITANK WEAPONS

In addition to large numbers of armored vehicles, Threat forces can be expected to saturate the battlefield with rocket-propelled grenades (RPGs), recoilless guns, and antitank guided missiles (ATGMs).

NATO Nomenclature: RPG-7

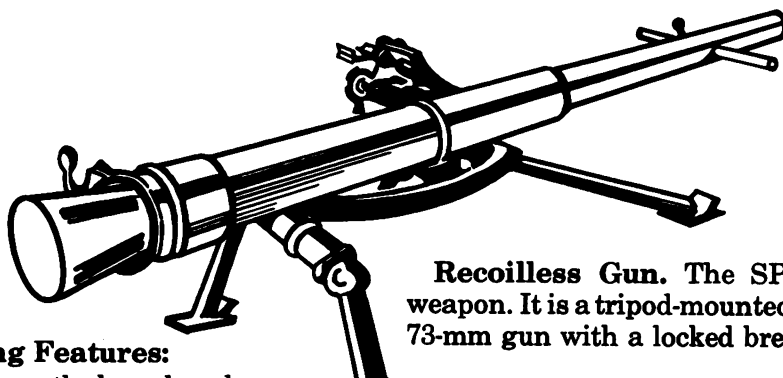


**Identifying Features:**

Two handgrips, large optical sight and a flared cone on the end.

**Rocket-Propelled Grenades.** RPGs are shoulder-fired infantry antitank weapons; current models are effective to 500 meters.

NATO Nomenclature: SP-G-9 73-mm Antitank Recoilless Gun



**Identifying Features:**

Cone shape on the breech end.

**Recoilless Gun.** The SP-G-9 is a new weapon. It is a tripod-mounted, manportable, 73-mm gun with a locked breech.



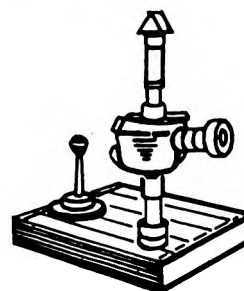
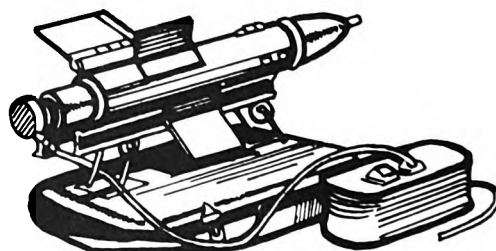
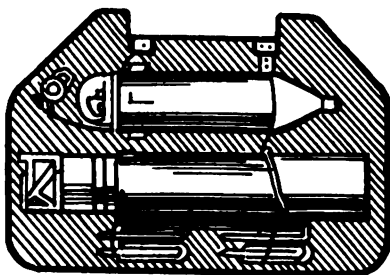
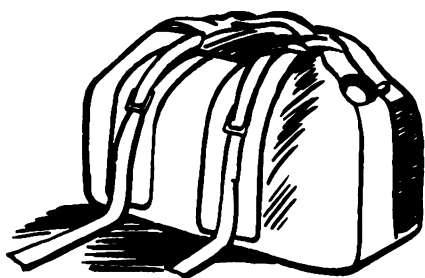
**Antitank Guided Missiles.** Threat forces have deployed two types of ATGMs in large numbers: the Sagger is wire-guided and thus invulnerable to electronic countermeasures (ECM); the Swatter is radio-guided and vulnerable to ECM.

ATGMs are highly accurate to 3,000 meters. They are highly mobile and can defeat all known armor.

Missiles can be mounted on BMPs, BMDs, BRDM-2s, and helicopters.

“Suitcase” Sagers can be man-packed and ground-mounted. In this version, the Sagger is easily carried by its crew. Its light weight and small size make it easy to transport, set up, and camouflage.

#### NATO Nomenclature: Sagger



The Sagger is a wire-guided antitank missile with an effective range of 3,000 meters. A three-man team carries the portable launcher, the fire control equipment, and two complete missiles. Gunner normally displaces 15 meters from the missile during firing. In flight identification: look for smoke and flare trail.



**Strengths.** The main strengths of Threat ATGMs are:

Long-range accuracy and lethality, which permit them to hit and defeat all known armor up to 3,000 meters away.

Versatility of employment, which enables ATGMs to be fired while crewmen are buttoned up and, in the case of the Sagger on a BRDM-2, at a remote position up to 80 meters from the vehicle. The "suitcase" Sagger may be remotely fired from a position up to 15 meters from the launching rail.

**Weaknesses.** In spite of their reliability, mobility, and long-range effectiveness, Threat ATGMs have weaknesses.

Gunners must have good visual contact with both target and missile during flight. Threat ATGMs are not effective at night. US cavalrymen who move behind cover, obscure themselves by smoke, or conceal themselves in vegetation reduce Threat missile and rocket hit probability. Bushes can break Sagger guidance wires, causing loss of missile control. Trees or heavy brush can detonate an ATGM warhead.

Gunners must be highly trained. Threat ATGM gunners must simultaneously track both target and missile with an optical viewer, while flying the missile with a "joystick" on a control box.

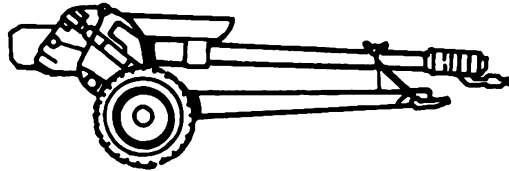
Missiles have a minimum range limitation. The missile has to fly about 500 meters after launch for the gunner to capture it in his viewer and accurately fly it to target. It is also slow moving when compared to the TOW.

## ARTILLERY

Threat forces are equipped with a variety of excellent artillery weapons, from light and heavy mortars and conventional field guns and howitzers to multiple rocket launchers (MRLs) and missiles. MRLs can deliver saturation fire, while conventional artillery fires against targets of opportunity and preselected targets.

The most common field pieces are 122-mm and 152-mm towed howitzers. The maximum range of the 122-mm howitzer is 15,300 meters and its rate of fire is 7 to 8 rounds per minute.

**NATO Nomenclature:** 122-mm Howitzer, D-30

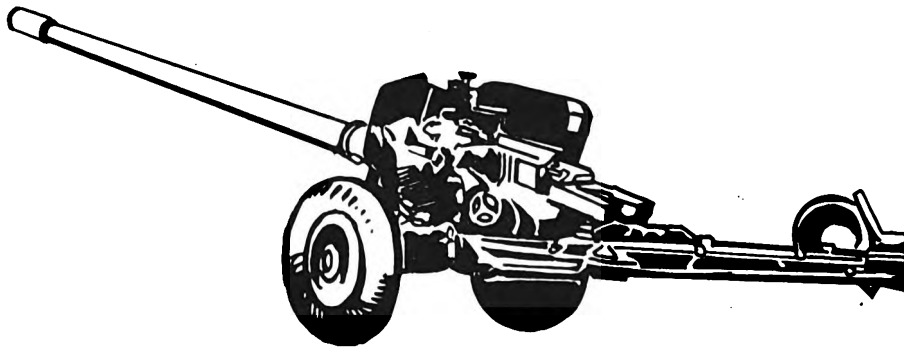


**122-mm Howitzer, D-30**

**Recognition features:** Three-trailed configuration; trails fold together and attach to tube for travel; towed by muzzle.

**Employment:** Direct support of maneuver company or battalion (regimental artillery battery and divisional artillery); weapon should appear 1 to 4 km behind the forward edge of the battle area in offense or 2 to 7 km in defense, depending on unit of assignment.

**NATO Nomenclature:** 100-mm AT Gun, T-12

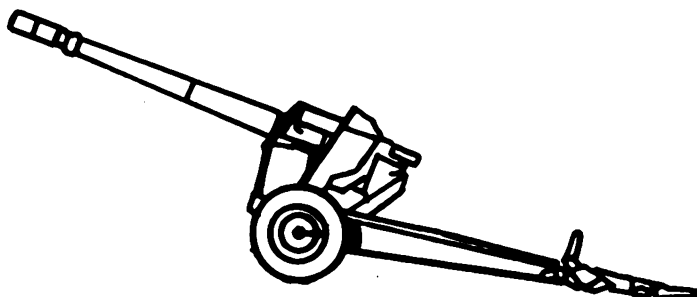


**100-mm Antitank Gun, T-12/T-12A**

**Recognition features:** Long tube with cylindrical "pepperpot" muzzle brake; single castor wheel near trail ends; winged shield angled to rear on either side, T-12A only; added cylinder to right and above breech.

**Employment:** Support of maneuver battalion; weapon should appear approximately 0.2 to 0.5 km behind forward edge of the battle area in offense and 0.2 to 2.0 km in defense.

**NATO Nomenclature:** 152-mm Gun Howitzer, D-20

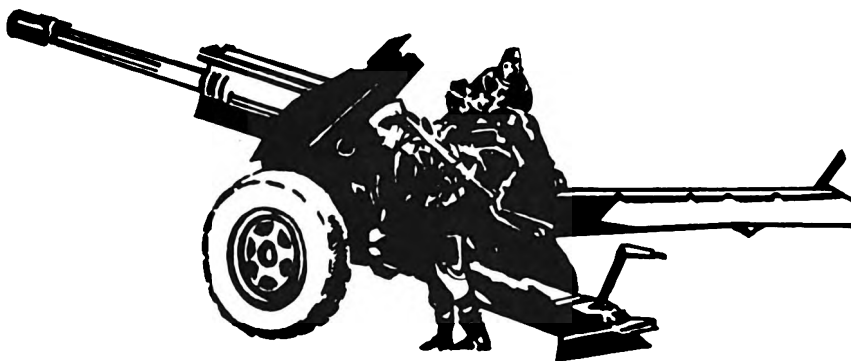


**152-mm Gun/Howitzer, D-20**

**Recognition features:** Prominent baseplate connected to bottom forward cradle for travel (same carriage as D-74); castor wheels and jacks at each trail end; scalloped winged shield with traveling central portion; shorter, larger diameter tube than D-74 with similar double-baffle winged, muzzle brake.

**Employment:** Weapon should appear 3 to 5 km behind the forward edge of the battle area in offense or 4 to 8 km in defense; organic to artillery battalions and regiments.

**NATO Nomenclature:** 152-mm Howitzer, D-1

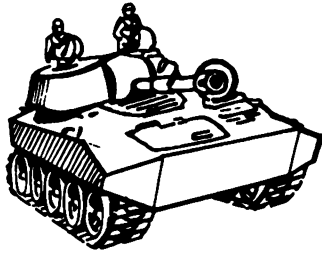


**152-mm Howitzer, D-1**

**Recognition features:** Essentially same appearance as the 122-mm howitzer, M-30 (M1938) except larger diameter tube and added double-baffle muzzle brake.

**Employment:** Weapon should appear 2 to 3 km behind the forward edge of the battle area in offense and 3 to 6 km in defense; organic to artillery units at combined arms army/division level.

Threat forces have recently been equipped with two new mobile artillery pieces: 122-mm and 152-mm self-propelled (SP) guns. The 122-mm SP gun is mounted on a tracked carriage which resembles the hull of the BMP personnel carrier and running gear of the PT-76 tank. The gun is mounted in a turret with compartments and hatches for both gunner and commander. Not much is known about the 152-mm SP.

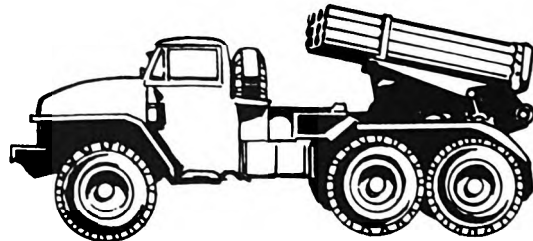
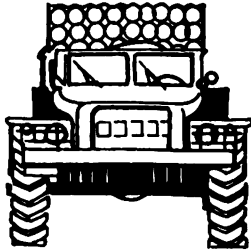


122-mm SP Gun



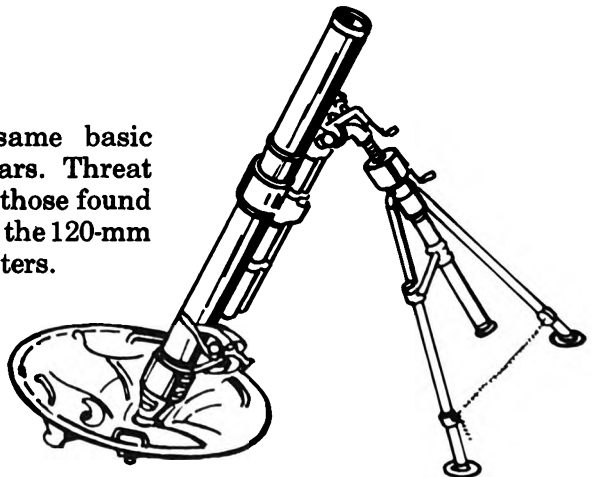
152-mm SP Gun

Threat forces usually use the multiple rocket launcher (MRL) for area coverage. These weapons are available in many sizes, but the most common is the 122-mm truck-mounted launcher, which can rapid fire up to 40 rounds at ranges out to 20,000 meters.



122-mm Rocket Launcher BM-21

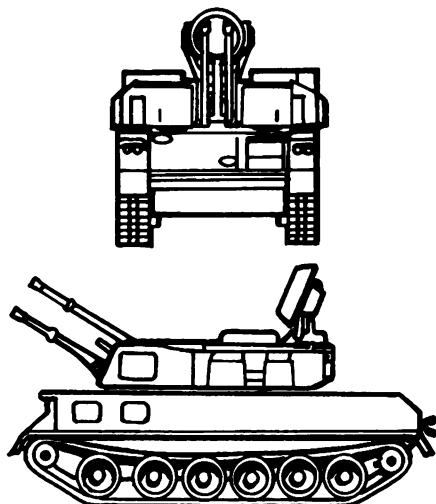
Threat mortars have the same basic support missions as US mortars. Threat mortars are almost the same as those found in US forces. One of the largest is the 120-mm mortar with a range of 5,700 meters.



120-mm Mortar

## ANTI-AIRCRAFT ARTILLERY AND MISSILES

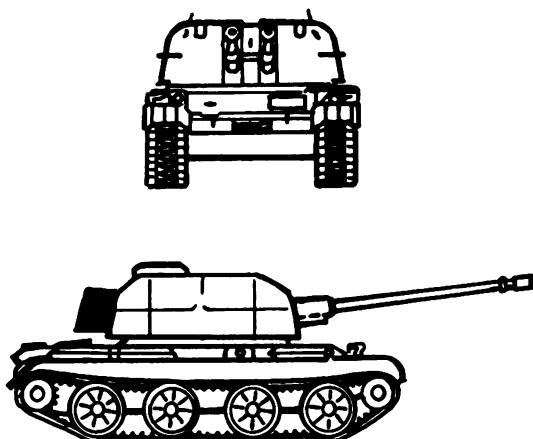
**Antiaircraft Artillery.** The Threat army has been reluctant to replace its conventional antiaircraft guns with more sophisticated surface-to-air missile (SAM) systems. Antiaircraft artillery weapons range in caliber from 12.7-mm to 130-mm. Present emphasis is on automatic, rapid-fire, highly mobile guns and missile systems designed to provide field armies with effective low-level air defense.



The ZSU-23-4 is a self-propelled system mounting four 23-mm guns with a completely integrated fire control system. The ZSU-23-4 is mounted on a light tracked chassis. Its on-board radar is used for both target acquisition and target tracking. Its four guns fire 800-1,000 rounds per minute, each with a tactical antiaircraft range of 3,000 meters and 2,000 meters without radar. It may be used against aircraft maneuvering to evade low- and medium-level surface-to-air missiles. The sustained rate of fire is 300 rounds per minute per barrel.

**Recognition features:** Full-tracked, six-roadwheeled vehicle; box-like hull with a rectangular turret centered over the third roadwheel; turret mounts four 23-mm automatic AA guns.

**Employment:** Located in AD gun battery of motorized rifle and tank regiments; organic to AA regiment of maneuver divisions.



The ZSU-57-2 is used by field air defense units in tank divisions. It consists of a modified T-54 tank chassis carrying a twin S-68 57-mm gun in a large, squarish, open top turret. The chassis has much less armor than the T-54 tank and the running gear uses only four roadwheels. It weighs 28.1 tons. The turret is also identifiable by the large basket on the rear where empty cartridge cases are stored. It can fire 105-120 rounds per minute per gun with a tactical antiaircraft range of 4,000 meters.

### REFERENCES:

FM 71-1, The Tank and Mechanized Infantry Company Team, Jun 77 (chap 2, pages 2-13 thru 2-17)  
 TC 30-3, Soviet Equipment Recognition Guide, Apr 75 (pages 1 thru 18)



**TASK NUMBER: 071-331-0807**

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**ENFORCE NOISE, LIGHT, AND LITTER DISCIPLINE**

---

**CONDITIONS:**

As the leader of a unit conducting any tactical mission (defense, offense, etc.) during daylight or the hours of darkness.

**STANDARDS:**

The leader will insure that:

1. Noise is kept at a minimum.
2. No light is visible to the enemy.
3. The area is free of litter and other evidence of the unit's presence.

**PERFORMANCE MEASURES:****1. Noise Discipline:**

a. Avoid unnecessary vehicular and foot movement.

b. Tape or otherwise secure metal parts (weapon slings, canteen cups, ID tags, etc.) to prevent them from making noise when contacting each other. Be careful that restricting moving parts of weapons does not prevent their operation.

c. Talk only when necessary to conduct or plan operations. Use radios only when necessary. Keep volume low so they can be heard only by the operator. Wire communications should be used whenever possible, especially in the defense.

**2. Light Discipline:**

a. Don't allow smoking except when concealed from possible enemy view. Discourage smoking at night; the enemy can see and smell it.

b. If flashlights or other lights are used, they must be filtered and concealed, such as underneath a poncho.

c. Cover anything that shines or glares (metal surfaces, vehicles, glass, etc).

d. Use all available natural concealment and camouflage vehicles, equipment, etc.

**3. Litter Discipline:**

a. When occupying fixed positions, establish collection points for disposal of empty food containers, empty ammo boxes, old camouflage, dirt from defensive positions, etc. During movement, carry litter until it can be disposed of without leaving any trace.

b. Conceal unused equipment from enemy view.

**REFERENCES:**

**FM 21-75, Combat Training of the Individual Soldier and Patrolling**

**TEC Lesson 935-071-1029-F, Counterintelligence**



**TASK NUMBER: 071-331-0809**

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**EMPLACE AND RECOVER FIELD EXPEDIENT  
WARNING DEVICES**

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**CONDITIONS:**

In daylight, given:

1. Used C-ration cans, used ammunition boxes, or other discarded metal containers.
2. Used ammo brass, pebbles, or other small, hard objects.
3. A location for a defensive position.
4. Barrier wire, WD-1 communication wire, or similar wire.
5. A suspected route of enemy advance or well-defined avenue of approach.
6. Thirty minutes to complete emplacement.

**STANDARDS:**

Within time specified, the devices must meet the following specifications:

1. **Security** - Devices must be securely attached to either barrier wire or WD-1 communication wire, etc., along a known or suspected route of enemy advance.
2. **Concealment** - Devices must not be readily observable by an enemy approaching at night.
3. **Forewarning** - Devices must produce sufficient noise to warn personnel in defensive position of enemy advancing toward their position.
4. **Simplicity** - Devices that could be used by the enemy against you must be easily removable upon leaving defensive position.

## PERFORMANCE MEASURES:

**1. Components.** Field expedient warning devices are limited only by your imagination. Four basic components are needed.

a. Container (C-ration can, metal ammunition box, or any other metal container without a bright, shiny finish).

b. Noise-maker (pebbles, stones, brass ammunition casings, or any other small, hard objects which, when put in the container, will make a noise when the container is shaken).

c. Tripwire (WD-1, barrier wire, or any similar wire).

d. Attachment device (a small piece of wire, string, cloth, etc., to tie container to tripwire).

### **2. Construction.**

a. Cut holes in the side(s) and bottom of the container (to reduce wind resistance and allow water drainage). If container has a bright, shiny finish, paint it with a subdued color (OD, brown, flat black) or cover it with mud (if only mud is available, consider using a different container).

b. Attach container to tripwire. If a wire barrier is in place, use it; if not, string tripwire across likely avenue of approach at knee level or below. Attach container at a spot where natural vegetation will conceal it from enemy detection.

c. Place noise-making objects in container.

d. Take a position at a defensive listening post and have another squad member brush against the wire holding the cans, to make sure you can hear the noise produced.

**3. Recovery.** Before leaving defensive position, recover devices that could be used by the enemy against you.

## REFERENCES:

TEC Lesson 952-061-0050-F, Expedient Early Warning Devices, Part 1

TEC Lesson 052-061-0051-F, Expedient Early Warning Devices, Part 2

**TASK NUMBER: 071-331-0810**

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**EMPLACE/RECOVER PYROTECHNIC  
EARLY WARNING DEVICES**

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**CONDITIONS:**

Situation 1: Given an M49A1 trip flare (either live or inert) and a designated area for employment of an early warning device.

Situation 2: Given WD-1/TT field wire or string, an M3 pull release training device (either live or inert), nonelectric blasting cap, crimpers, and a designated area for employment of an early warning device.

**STANDARDS:****1. Installing Devices:**

a. Install trip flare (M49A1) or M3 firing device so that the devices are firmly attached in place across designated area.

b. Arm devices so that anyone moving the trip wire/string will make the device go off.

**2. Removing Devices:**

a. Remove trip flare by first reinserting the safety pin and then reversing installation procedures.

b. The M3 (live) is dangerous to disarm. It should be blown in place. If the device must be disarmed, proceed as outlined in the performance measures below.

**PERFORMANCE MEASURES:**

1. **General.** Trip flares and M3 firing devices with trip wire are employed extending across any trail approaching from the direction of enemy main forces, allowing for maximum observation of trail from friendly positions. Typical employment sites may have the following characteristics:

a. A narrow trail approaches from the direction of enemy main forces; it is about 100 meters forward, and is near the adjacent friendly unit.

b. Two routes in open terrain approach your position directly; each route is about 10-15 meters wide.

c. A narrow wash approaches to within 10-15 meters of a listening post.

d. A narrow trail, approaching from the direction of bypassed enemy.

**2. To Emplace an M49A1 Trip Flare:**

a. The location chosen for installation of the flare and trip wire should be in the logical path of infiltrating troops and so positioned that the field toward the enemy will be illuminated and friendly defense positions will not be disclosed.

b. In most instances, it is easier to install the flare using the pullpin method, because the amount of slack in the trip wire is less critical. Also, the trip wire may be installed to the left or right of the flare.

c. To mount bracket by nailing, use two of the nails provided. The bracket must be as vertical as possible and at a height of 15 to 18 inches above the ground.

d. To mount flare, align lever with trigger pivot.

e. Carefully slide flare downward into its bracket until bottom edge of lever is no more than 1/16 inch above — but not past — the bracket. In this position, note that the flare base is approximately 1/2 inch below the upper carriage bolt. The bottom end of lever is approximately 3/8 inch below the bracket prongs and is centered between these prongs (figure 1).

**NOTE:** If the flare is positioned below the slot, in the bracket, the lever will not be free to move for proper arming. If the lever is not aligned with the trigger pivot and centered between the prongs, the lever will not be free to move for proper arming.

f. Clamp flare in its bracket by tightening upper wingnut with sufficient force to grip flare firmly.

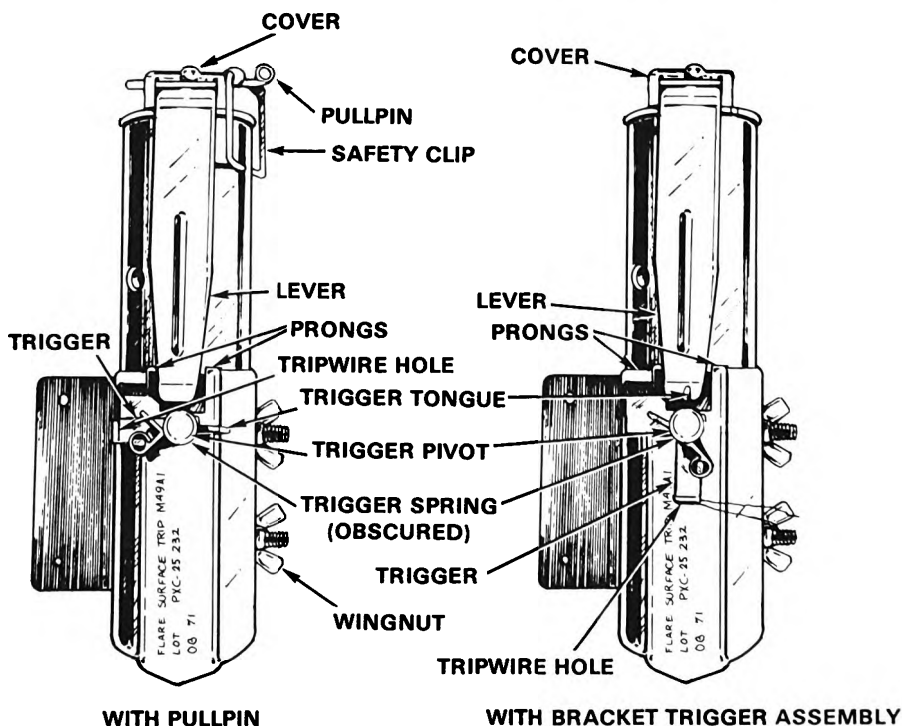


Figure 1.

### 3. To Arm the M49A1 Trip Flare Using the Pullpin Method:

a. Fasten one end of trip wire to a post, stake, or other rigid object, at the desired distance (usually 40 feet) from flare and to the right or left of flare when facing flare trigger.

**WARNING: Do not release lever when pressing it down in 3b below, because release of lever will cause flare to function.**

b. Press lever down with one hand and remove safety clip assembly.

c. While still holding lever, insert pullpin, which is attached to safety clip, through two safety clip holes of cover loading assembly.

**WARNING: Before releasing lever in 3d below, make certain pullpin will hold in safety clip holes.**

d. Carefully release hold on lever. Make certain pullpin is retained in safety clip holes by lever.

e. Pull loose end of trip wire taut and fasten it to loop in pullpin.

f. Check to see that the trip wire is taut and tightened at both ends.

g. Flare is now prepared for firing. Sufficient pressure applied to trip wire will pull safety from flare.

4. **Misfire of the M49A1.** In case of failure to fire, the flare should not be approached for 5 minutes. After the waiting period, the flare should be removed carefully and forwarded to authorized personnel for disposal.

5. **Recover Flares Prepared for Use but Not Used.** Follow procedures below to disarm.

**WARNING: Any flare having a loose cover loading assembly will be forwarded to authorized personnel for disposal. Make no attempt to reassemble or tighten cover loading assembly.**

a. Disarming.

(1) Carefully depress lever against flare body.

(2) If pullpin was used as method of arming, remove pullpin.

**WARNING: Use only the safety clip holes in cover loading assembly when reassembling safety clip. The other holes must not be used.**

(3) Secure lever by inserting one end of safety clip through one of the safety clip holes of cover loading assembly; snap other end of safety clip into other safety clip hole.

(4) Detach wire from pullpin.

(5) Return flare to its original packing.

c. Inspection. Prior to returning flare to storage, perform an inspection.

## 6. To Emplace a M3 Pull Ring Firing Device.

### a. Functioning.

(1) Pull method. A pull of 6 to 10 pounds on taut trip wire will cause device to fire.

(2) Tension-release method. Release of tension (cutting of taut trip wire) will cause device to fire.

### b. To Install the M3 Firing Device (figure 2).

(1) Remove protective cap.

(2) With crimpers, attach blasting cap to standard base. *Crimper jaws should be placed no farther than 1/4 in. from open end of blasting cap.*

(3) Attach firing device assembly to anchor (must be firm enough to withstand pull of at least 20 pounds).

(4) Secure one end of trip wire to anchor and place other end in hole in winch.

(5) With knurled knob, draw up trip wire until locking safety pin is pulled into wide portion of safety pin hole.

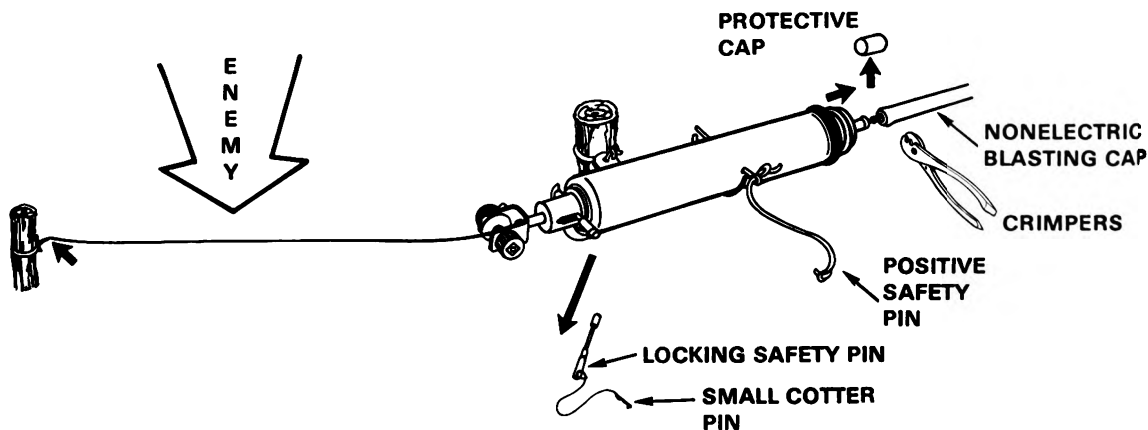


Figure 2.

**c. Arming.**

(1) With cord, remove small cotter pin from locking safety pin and withdraw locking safety pin. If it does not pull out easily, adjust winch winding.

(2) With cord, pull out positive safety pin. This should pull out easily. If not, disassemble and inspect.

**d. Disarming.**

(1) Insert length of wire, nail, or cotter pin in positive safety pin hole.

(2) Insert length of wire, nail, or safety pin in locking safety pin hole.

(3) Check both ends and cut trip wire.

(4) Separate firing device from charge and return firing device to its container.

**NOTE: Insert positive safety pin first. Cut trip wire last.**

**REFERENCES:**

**FM 5-25, Explosives and Demolitions, Feb 71 (chap 1, sec VI, pages 1-36 thru 1-37)**

**FM 5-34, Engineer Field Data, Sep 76 (chap 3, sec I, page 46b)**

**FM 20-32, Mine/Countermining Operations at Company Level, Nov 76 (app D, page 153, para D-1 thru D-7)**

**TM 9-1345-200, Land Mines, C1, 3, 5, 6 and 7, Jun 64 (chap 5, page 107)**

**TEC Lesson 952-061-0052-F, Trip Flares**





**TASK NUMBER: 071-331-0811**

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**EMPLACE/RECOVER ELECTRONIC  
ANTI-INTRUSION DEVICES**

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**CONDITIONS:**

Given a patrol seismic intrusion device (PSID) detector unit (in storage), an area for emplacement of the PSID, a detection range setting, and a PSID receiver and receiver operator in the area of emplacement.

**STANDARDS:**

1. Within 8 minutes, emplace the PSID IAW the performance measures for emplacement.
2. Within 5 minutes, recover the PSID and return to storage configuration IAW the performance measure for recovery.

**PERFORMANCE MEASURES:****1. Unpacking (figure 1).**

a. Remove the detector sets and receiver sets from the carrying cases and remove the clips which are over the end of each unit. Remove the geophone from the clip on the detector, and unwrap the geophone cables. Remove the headset and headband from the carrying case. Connect the headset cable to the receiver set.

b. Inspect each unit for damage (e.g., broken antenna, cracked case, damaged cable). If any damage exists, either repair or reject the unit.

c. Remove the batteries from their shipping carton. Place the ON/OFF sensitivity switch on the detector sets in the OFF position, and the ON/OFF switch on the receiver set in the OFF position. Install the batteries in the detector sets and the receiver set. Place 10 spare batteries in the alarm set carrying case.

d. Make sure that all detectors of the alarm set are marked with the same RF frequency as the receiver. All four pulse codes should be present. The units with the wrong frequency or pulse code will be taken from the alarm set and returned to supply.

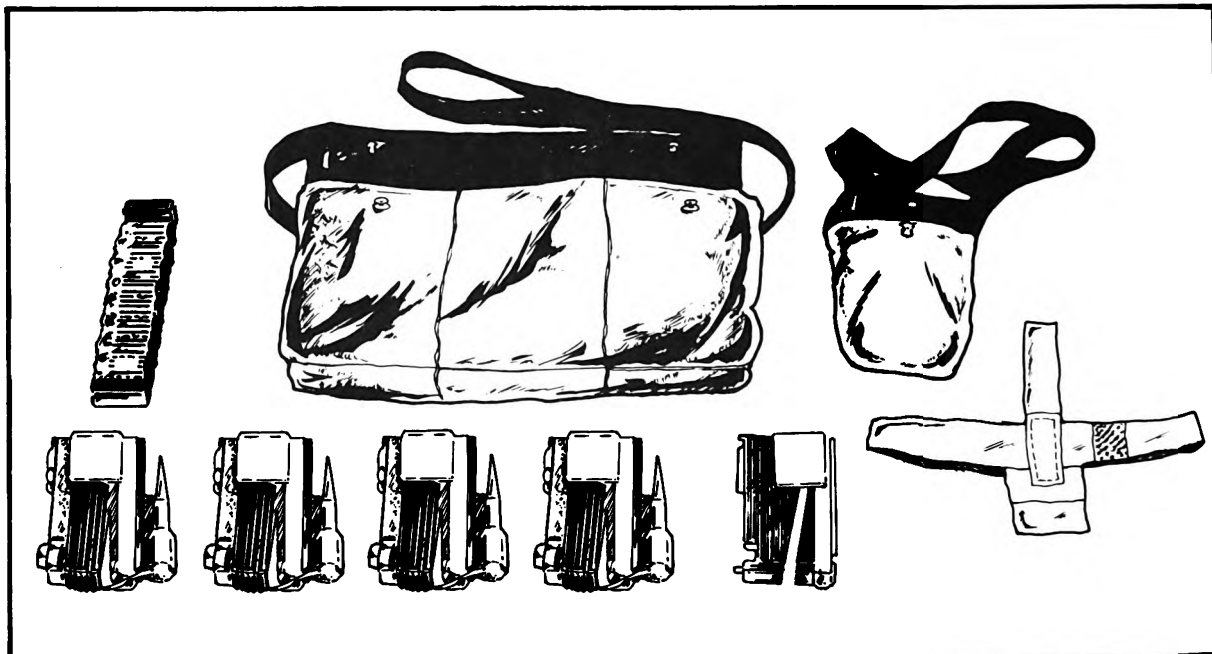


Figure 1. Alarm set, anti-intrusion (PSID).

## 2. Preparation and Checkout.

- a. Select a suitable location for the checkout area. The conditions of this area should be similar to those of the actual use area.
- b. Select one of the detector sets and notice the pulse code marked on the detector case. Emplace the detector set in the checkout area as shown in figure 2. The receiver operator should be 4 to 5 meters (13 to 16 feet) from the detector set.

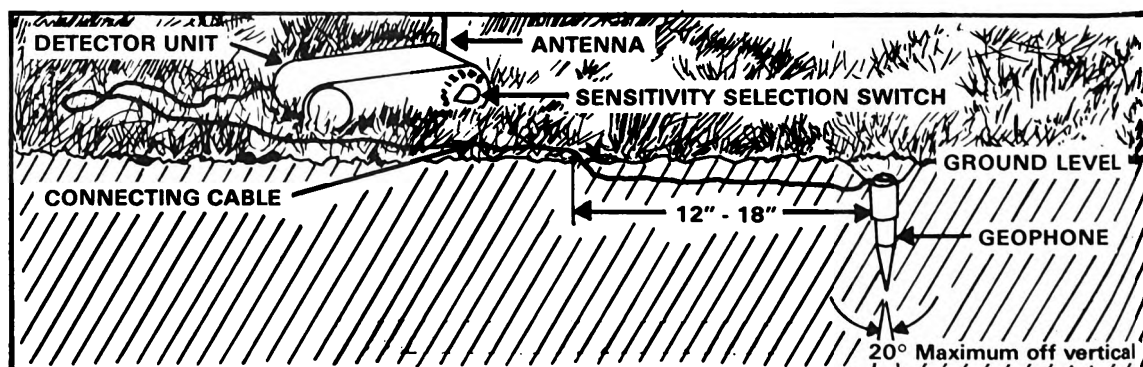


Figure 2. PSID emplacement.

- c. Turn the detector ON/OFF sensitivity switch to position number one (1), and the receiver ON/OFF switch to the ON position. If the detector operator does not move, the receiver operator should not hear a signal. If the receiver operator does hear a signal, either there is excessive background noise in the checkout area or the detector set is defective.

d. When the detector operator moves within the radius of the detector range shown in figure 3, the receiver operator should hear a signal. **NOTE: He may or may not hear a signal for each movement.**

e. If the receiver operator hears a signal or signals which match the pulse code marked on the detector set, the position of the ON/OFF sensitivity switch and the distance between the detector set and receiver set should be noted for proper setup when the detector is deployed in the use area. Return the ON/OFF sensitivity switch to the OFF position. Remove the geophone from the ground. Wipe the case and geophone clean; then return the detector set to the carrying case for move to the use area.

ON/OFF SENSITIVITY SWITCH POSITIONS	PERSONNEL MOVEMENT RANGE
OFF	0 feet 0 meters
1	8 feet 2.6 meters
2	15 feet 4.9 meters
3	50 feet 16.5 meters
4	70 feet 23 meters
5	130 feet 43 meters

*Figure 3. Detector sensitivity range.*

f. If the receiver operator does not hear a signal, set the ON/OFF sensitivity switch to the next higher position and/or decrease the distance between the detector set and receiver set as necessary until the receiver operator hears a signal or signals matching the pulse code marked on the detector case, and repeat paragraph 2e.

g. In all cases, select the switch setting which allows no false signal when the detector operator is not moving, but which gives a signal when the detector operator moves within the detector sensitivity range. If both conditions cannot be met, select the nearest approximations or relocate the checkout area to a location with less background noise.

h. Repeat the preceding procedure for each of the detector sets.

### 3. Emplace the Detector Sets.

a. The detector sets will be emplaced as shown in figure 2. The deployment location should be one which has a low level of background noise (background noise is defined as any undesired vibration within the sensitivity range of the detector set, such as high winds, rain, low-flying aircraft, and similar sources of ground disturbances). Some areas which present high levels of background noise would be airfields, heavily traveled

roadways, heavily congested areas, and roadways with heavy vehicles traveling as much as a mile from the detector set. Background noise of a sufficient level could cause the detector set to transmit meaningless signals indicating movement in an area where there is none.

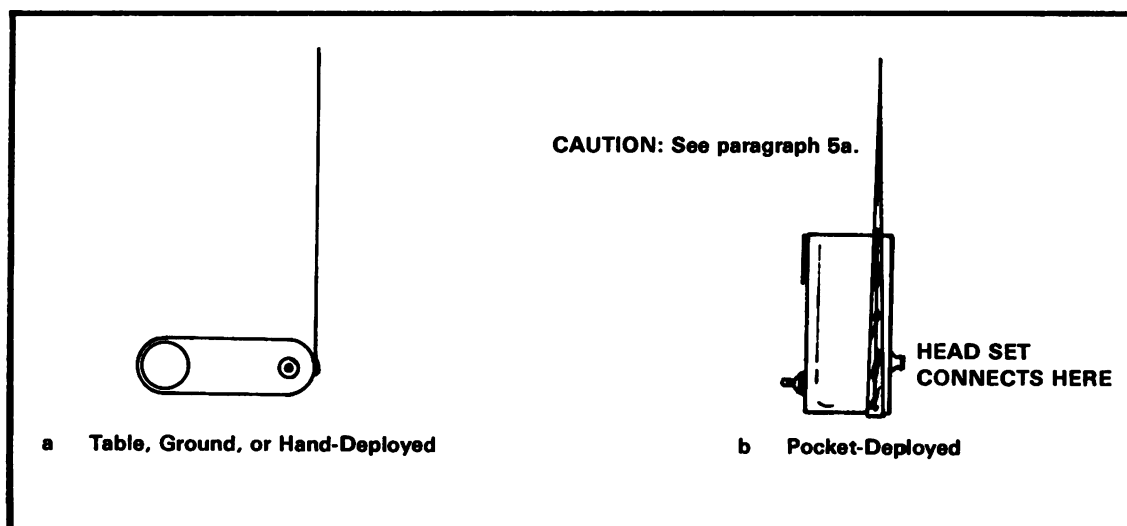
- b. Remove the plastic storage clip from the PSID unit.
- c. Unclip the geophone and unwind the connecting cable and antenna. Slide the plastic clip back over one end of the detector unit so it will not be mislaid.
- d. Push the geophone straight down into the ground (no more than 20 degrees off vertical or it will not work). Do not drive the geophone into the ground by striking it with a hard object or stamping on it. Loosen the soil with an intrenching tool, stick, or other sharp object, if necessary.
- e. Bury 12 to 18 inches of the connecting cable adjacent to the geophone. This cuts down on the possibility of cable movement activating the geophone. (See figure 2.)
- f. Position the detector unit on the ground, being sure the antenna is not in contact with any wet foliage that might ground it.
- g. Set the sensitivity selection switch for the detection range you have been given.
- h. During daylight hours, camouflage the detector unit and connecting cable with dry twigs and weeds. This is not usually necessary at night.

**4. Geophone.** The geophone senses the movement of personnel and vehicles in the area of the detector. The detector in turn transmits a message until the movement is outside the detector's sensitivity range. If it is desirable to establish the direction of movement, the detectors can be arranged in such a manner where movement from one detector range into another detector range will indicate the direction of travel. Under ideal conditions, the transmitted signal from the detector set will be received a maximum of 1 mile (1852 meters).

## 5. Receiver Set.

a. The two acceptable configurations in which the receiver set may be utilized are shown in figure 4. In the configuration (a), the receiver may be placed on a table, the ground, or held in the hand. The antenna should be free of any obstruction. In configuration (b), the receiver may be placed in the shirt pocket. **CAUTION: The antenna should be on the side away from the body to avoid the possibility of malfunction or poor reception due to body perspiration.**

b. When the receiver picks up the transmitted signal, it converts it to a pulsed audio tone which is heard through the headset. An experienced receiver operator will be able to determine which detector is transmitting by the tone, as well as the number of pulses. In place of the headset, a small speaker of the proper impedance may be used, or an amplifier with the proper input impedance may be used in conjunction with the receiver set.



*Figure 4. Receiver configuration while in use.*

#### **6. Recovering the PSID.**

- a. Locate the detector unit and turn the sensitivity switch to the OFF position.
- b. Trace along the connecting cable and gently uncover the buried cable until you get to the geophone.
- c. Dislodge the geophone by grasping it, not the connecting cable, and pulling it loose.
- d. Remove the storage clip and brush all dirt and debris off the equipment.
- e. Rewind the antenna around the detector unit, wrap the cable around the unit, clip the geophone into the holder, and fasten the plastic storage clip over the wire and antenna.

#### **REFERENCES:**

TM 5-6350-249-12, AN/GSO-151, Alarm Set, Anti-Intrusion Restricted Area (PSID), C1, Dec 69 (sec I, II, and III, pages 1-1 thru 3-3)

TEC Lesson 952-061-0054-F, Early Warning Devices: Electronic, Part 1

TEC Lesson 952-061-0055-F, Early Warning Devices: Electronic, Part 2



**TASK NUMBER: 113-600-3001**

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**PERFORM OPERATOR PREVENTIVE MAINTENANCE  
ON TELEPHONE SET (TA-312/PT OR TA-1/PT)**

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**CONDITIONS:**

You are in a field training exercise or performing required garrison maintenance. Given an installed operational TA-1 or TA-312 telephone set, blank DA Form 2404, (TL 13A if required), 3 feet of WD-1/TT wire, cleaning compound (FSN: 7930-395-8542), clean rags, a brush, TM 11-5805-201-12 or TM 11-5805-243-12, and TM 38-750.

**STANDARDS:**

1. Perform all prescribed operator maintenance steps as required by the appropriate TM.
2. Complete DA Form 2404 IAW TM 38-750, para 3-4.

**PERFORMANCE MEASURES:**

1. Perform all prescribed operator maintenance steps for the TA-312, IAW TM 11-5805-201-12, para 4-2, pages 4-4 thru 4-5.
2. Perform all prescribed operator maintenance steps for the TA-1, IAW TM 11-5805-243-12, para 21 thru 23, pages 11 thru 14.
3. Conduct, as a minimum, the following services on either telephone set.
  - a. Check for completeness.
  - b. Check for proper installation.
  - c. Check for cleanliness.
  - d. Check battery compartment for cleanliness and foreign matter (TA-312 only).
  - e. Check H-60/PT for proper seating in retaining cradle (TA-312 only).
  - f. Check binding post for tight connection.
  - g. Check to see that all controls, knobs, and switches operate properly without binding.
  - h. Check reception and transmission of telephone set.

4. Previously reported faults beyond the operator's capability to repair or those requiring parts are recorded on the Uncorrected Fault Record (DA Form 2408-14) in the logbook. This form is completed by organizational maintenance.

5. Faults which the operator cannot correct or which require a part are recorded on DA Form 2404 IAW procedures outlined in paragraph 3-4 of TM 38-750.

**REFERENCES:**

**TM 11-5805-201-12, Telephone Set TA-312/PT, C1, Jun 67 (chap 4-2, pages 4-4 thru 4-5, para 4-3)**

**TM 11-5805-243-12, Telephone Set TA-1/PT, C3-5, Sep 59 (chap 4, pages 11 thru 15)**

**TM 38-750, The Army Maintenance Management System (TAMMS), C1,2, May 78 (chap 3, pages 3-4 thru 3-7, para 3-4)**

**TEC Lesson 936-061-0125-F, Field Wire Installation; Equipment  
TEC Lesson 936-061-0129-F, Field Wire Installation; Maintenance  
and Troubleshooting**

**TEC Lesson 936-061-0137-F, Local Battery Operation**



**TASK NUMBER: 113-600-1001**

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**INSTALL TELEPHONE SET (TA-312/PT OR TA-1/PT)**

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**CONDITIONS:**

**Situation 1:** Given a working telephone set TA-1/PT, pliers TL-13A, an installed wire line WD-1/TT, and a telephone or switchboard with an operator at the far end of the wire line.

**Situation 2:** Given a working telephone set, TA-312/PT, two BA-30 batteries, pliers TL-13A, an installed wire line WD-1/TT, and a telephone or switchboard with an operator at the far end of the wire line.

**STANDARDS:**

Install either field telephone IAW the performance measures below.

**PERFORMANCE MEASURES:****1. Installing the telephone set TA-1/PT:**

- a. Using pliers TL-13A, strip ½-inch of insulation from each strand of the wire line.
- b. Refer to figure 1. Depress the spring-loaded line binding posts and insert one strand into each post.
- c. Adjust signal volume control knob to LOUD.
- d. Depress the generator lever several times to call the other operator and ask for a buzzer signal.
- e. When the buzzer sounds, turn the buzzer volume control knob until desired volume is obtained, then look at the visual indicator to see if it shows four white luminous markings.
- f. To talk, depress the push-to-talk switch; release it to receive.
- g. As a field expedient, the receiver can be used for both transmitting and receiving.

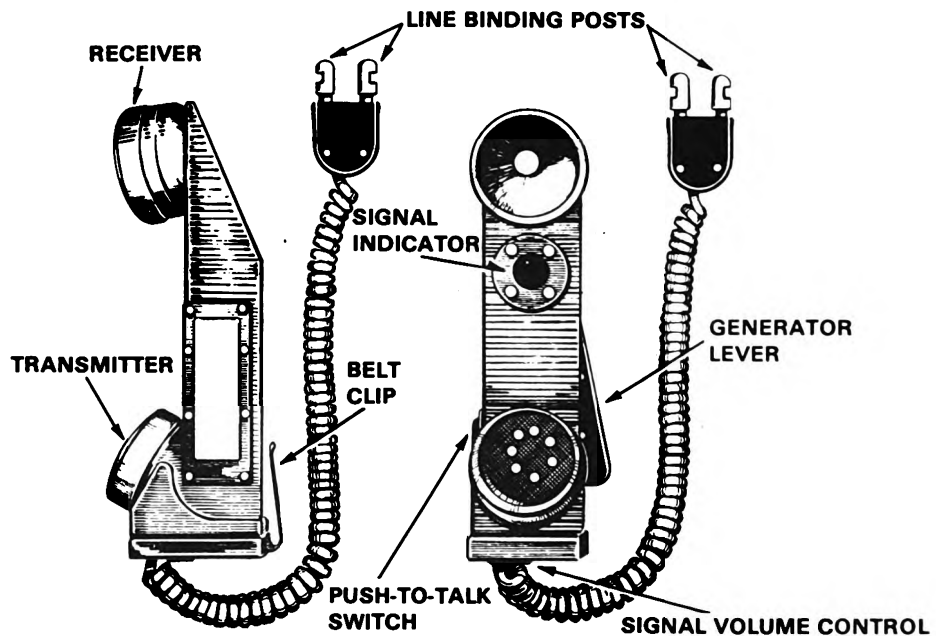
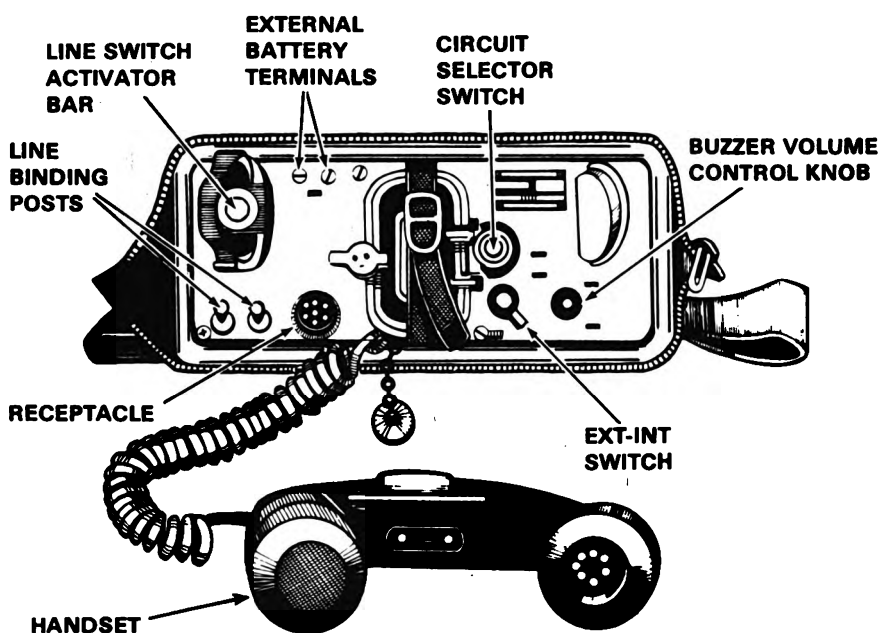


Figure 1.

## 2. Installing the telephone set TA-312/PT:

- a. Using pliers TL-13A, strip  $\frac{1}{4}$ -inch of insulation from each strand of the wire line.
- b. Refer to figure 2. Depress the spring-loaded line binding posts and insert one strand into each post.
- c. Adjust buzzer volume control knob to LOUD.
- d. Place the INT-EXT switch to INT.
- e. Place the circuit selector switch to LB.
- f. Insert the BA-30 batteries into the battery compartment, one up and one down.
- g. Be sure the handset is seated firmly in the retaining cradle.
- h. Turn the handcrank rapidly a few turns.
- i. Remove the handset from the retaining cradle and wait for the operator to answer.
- j. Depress the push-to-talk switch to talk, and release it to listen.
- k. Request the other operator to give you a ring back.
- l. When the buzzer rings, terminate the call and place the handset in the retaining cradle.



*Figure 2.*

#### REFERENCES:

- TM 11-5805-201-12, Telephone Set TA-312/PT, C1, 2, Jun 67 (chap 2, page 2-1 thru 2-8, para 2-1 thru 2-5)
- TM 11-5805-243-12, Telephone Set TA-1/PT, C3-6, Sep 59 (chap 2, page 6, para 9-12)
- TEC Lesson 936-061-0126-F, Field Wire Installation: Ties
- TEC Lesson 936-061-0128-F, Field Wire Installation: Splicing
- TEC Lesson 936-061-0137-J, Local Battery Operation



**TASK NUMBER: 113-587-3005**

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**PERFORM OPERATOR MAINTENANCE ON RADIO  
SETS; AN/PRC-77 OR AN/VRC-64**

---

**CONDITIONS:**

You are participating in a field exercise or performing required garrison maintenance. Given either radio set (AN/PRC-77 or AN/VRC-64), prepared for operation, the appropriate TM, clean cloth, trichloroethylene, mild soapy water, flat tip screwdriver, a radio station within range, callsigns, a frequency, a blank DA Form 2404, and TM 38-750.

**STANDARDS:**

1. Perform all prescribed operator maintenance steps as required by the appropriate TM.
2. Complete DA Form 2404 IAW TM 38-750, para 3-4.

**PERFORMANCE MEASURES:**

1. Perform all prescribed operator maintenance steps for the AN/PRC-77 IAW TM 11-5820-667-12, chap 4, pages 4-1 thru 4-3, para 4-1 thru 4-8.
2. Perform all prescribed operator maintenance steps for the AN/VRC-64 IAW TM 11-5820-498-12, chap 4, pages 4-1 thru 4-12, para 4-1 thru 4-11.
3. Previously reported faults beyond the operator's capability to repair or those requiring parts are recorded on the Uncorrected Fault Record (DA Form 2408) in the logbook. This form is completed by organizational maintenance IAW procedures outlined in paragraph 4-13 of TM 38-750.
4. Faults which the operator cannot correct or which require a part are recorded on DA Form 2408 IAW procedures outlined in paragraph 3-4 of TM 38-750.

**REFERENCES:**

TM 38-750, The Army Maintenance Management System (TAMMS), C1,2, May 78 (chap 3, pages 3-4 thru 3-7, para 3-4)  
TM 11-5820-498-12, Radio Sets AN/VRC-64 and AN/GRC-160, C5, May 67 (chap 4, pages 4-1 thru 4-12, para 4-1 thru 4-11)  
TM 11-5820-667-12, Radio Set AN/PRC-77, C1 thru 6, Jun 67, (chap 4, pages 4-1 thru 4-3, para 4-1 thru 4-8)  
TEC Lesson 201-113-4501-F, Preparation of Radio Set AN/PRC-77 for Operation Part 1: Installation



**TASK NUMBER: 113-587-2001**

---

**OPERATE RADIO SET AN/PRC-77 OR AN/PRC-25**

---

**CONDITIONS:**

Given a functional radio set (AN/PRC-77 or AN/PRC-25) with all parts, a frequency, callsigns, another station within range (can be another radio operator requiring training), knowledge of how to make a radio check, and battery BA-4386. Entering a radio net is not required in this task.

**STANDARDS:**

Within 2 minutes, assemble the AN/PRC-77 or AN/PRC-25 and make a communication check with the other station.

**PERFORMANCE MEASURES:**

1. **Assembly of radio set AN/PRC-77 (figure 1)** (TM 11-5820-667-12, chap 1, pages 1-2 thru 1-5). Inspect radio set to insure that all components are present:

- |                            |                                  |
|----------------------------|----------------------------------|
| a. Electrical harness.     | e. Handset.                      |
| b. Antenna, AT-892/PRC-25. | f. Cotton-duck bag.              |
| c. Antenna, AT-271/A PRC.  | g. Receiver-transmitter, RT-841. |
| d. Antenna support.        | h. Battery BA-4386.              |

2. **Installation of battery (figure 2)** (TM 11-5820-667-12, chap 2, page 2-4, para 2-4).

- a. Place radio on control guard, and remove battery box.
- b. Do not install battery (BA-4386) until you are certain air vent in battery box works.
  - (1) Depress valve and blow from the outside; air should pass through the vent.
  - (2) Release the valve and blow; air should not flow.
- c. Check pressure relief valve before installing battery.
- d. Place battery in battery box as shown in figure 2.

**CAUTION: Do not break floating connector.**

- e. Replace battery box and close both latches at the same time.

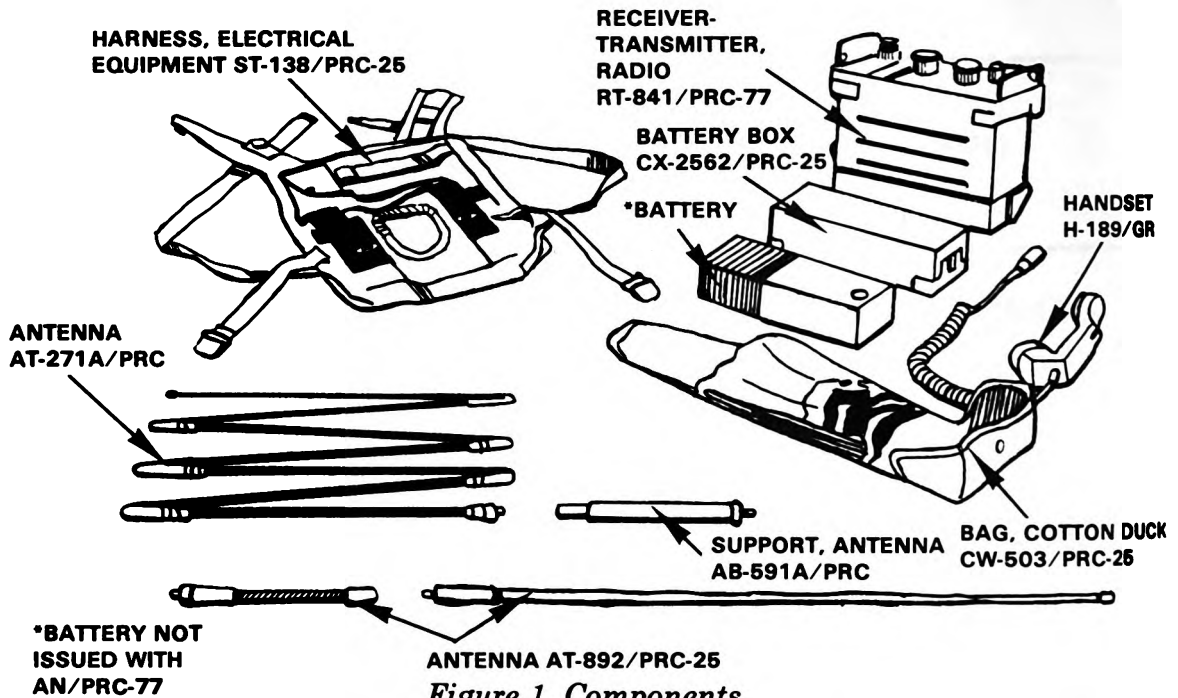


Figure 1. Components.

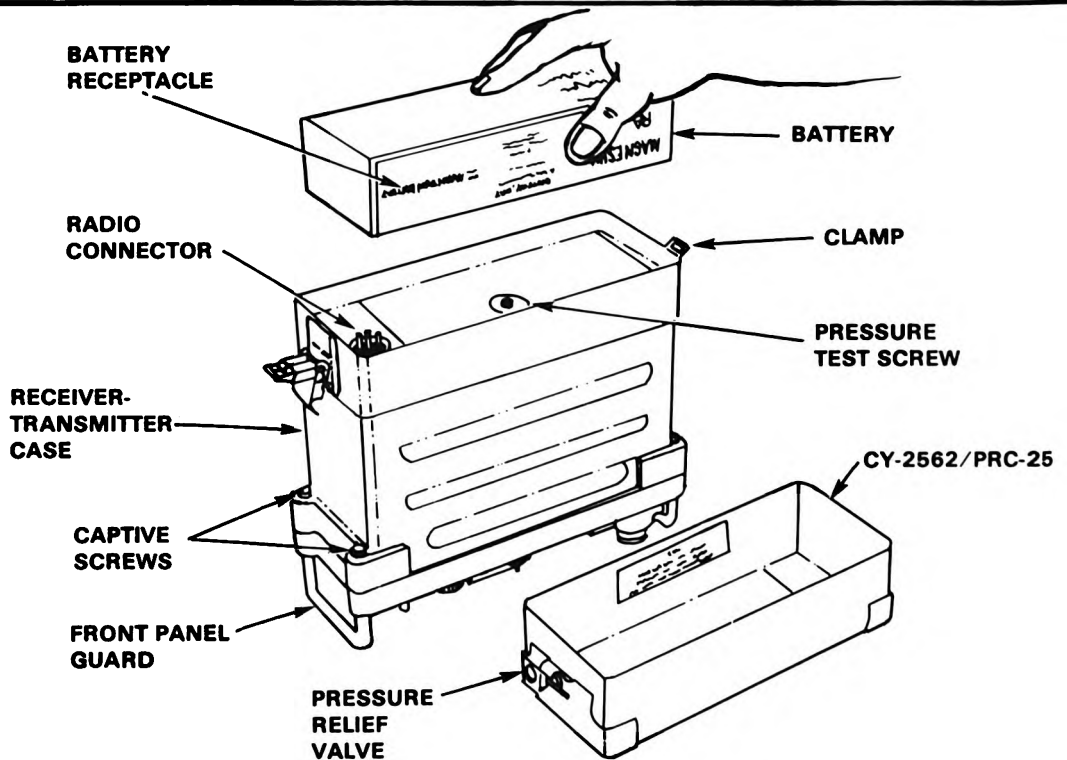


Figure 2. Installing battery in receiver-transmitter.



3. To operate set (figure 3) (TM 11-5820-667-12, chap 3, pages 3-1 thru 3-7).

a. The numbers of steps 1 through 6 below relate to the numbers in figure 3.

(1) Install the antenna required for the type of operation in the antenna mount.

(2) Attach handset H-189/GR to either audio connector.

(3) Turn the function switch to on.

(4) Turn the band switch to the desired operating frequency band.

(5) Turn the MC tuning and KC tuning control knobs until desired frequency appears in the channel dial (7).

(6) Turn the volume control to 4.

(7) Press the handset H-189/GR push-to-talk switch and speak into handset; release the push-to-talk switch to listen.

(8) Adjust the volume control (6) for a desirable sound level.

(9) To reduce the rushing noise when no signal is being received, turn switch (3) to squelch.

b. Make a radio check with other stations.

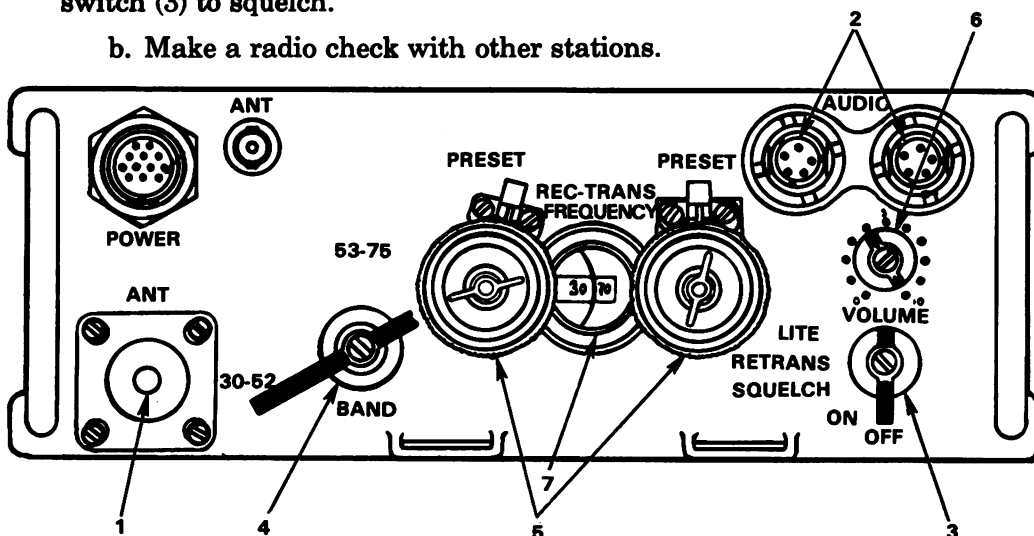


Figure 3.

c. To turn set off: Turn the function switch (3) to off.

## REFERENCES:

TM 11-5820-667-12, Radio Set AN/PRC-77

TEC Lesson 201-113-4501-F, Preparation of Radio Set, AN/PRC 77 for OP PT 1, Install

TEC Lesson 201-113-4502-F, Preparation of Radio Set, AN/PRC-77 for OP PT 2, Operation Checks

TEC Lesson 201-113-4503-F, Preparation of Radio Set, AN/PRC-77 for OP PT 3, Pre-Sets



**TASK NUMBER: 113-573-8001**

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**USE AN AUTOMATED CEOI**

---

**CONDITIONS:**

Given an extract of the division Communications-Electronics Operating Instructions (CEOI) and directions to determine, for a specified time period, any or all of the following:

- a. The frequency(s) of specified unit nets.
- b. The callsign(s) of station(s) within a given net.
- c. Your own item number identifier.
- d. Another station's identity, given its item number identifier.

**STANDARDS:**

1. Within 2 minutes (for each station), determine the complete individual callsign (to include suffix) assigned by the CEOI to that station, for the time period specified, and state (or show) it to your supervisor.
2. Within 1 minute (for each net), determine the frequency assigned by the CEOI to that unit, for the time period specified, and state (or show) it to your supervisor.
3. Within 2 minutes, determine your own item number identifier as given in the CEOI for the time period specified.
4. Within 2 minutes, determine an unknown station's unit identity.

**PERFORMANCE MEASURES:****1. General:**

a. The CEOI contains specific instructions for the operation of communication systems under a division headquarters — and is the only authorized document from which subordinate elements will extract information to compile organization/unit CEOIs — for use during tactical training and contingency operations.

b. Callsigns, suffixes, and frequencies will be changed simultaneously during each time period throughout the division. Specific callsign and frequency assignments will not be transmitted in the clear over nonsecure means of communication. If such transmission is required, the callsign and frequency must be encoded using the current tactical unit operations code or

numeral/cipher authentication system. All information is listed according to time periods. When determining callsigns and frequencies, be sure you look under the correct time period. [Your supervisor can explain the local time period designation procedure that you should use.]

**2. To determine callsigns:** To find the callsigns for a given element (for example: 1/77 Inf, A Co, 1st Plt Ldr), turn to the index (figure 1a) of the CEOI. Follow the left-hand column of items until you find the parent unit (e.g., 1/77 INF BN). Next, look across from the parent unit to the right-hand column under the item number heading to find the correct item number (6A) and turn to that item number (figure 2a). Determine the correct time period (01) and look down the column headed by that time period to find the callsign for 1/77 Inf, A Co, 1st Plt (J1M). Then, go back to the index (figure 1a) and find the item number for suffixes (item no. 2). Turning to that item number (figure 3), find PLT LDR. Located to the left of PLT LDR is its two-digit suffix (13). Combining the callsign (J1M) with the suffix (13) gives you the complete five-character callsign for the Plt Ldr, 1st Plt, A Co, 1/77 Inf Bn (J1M13).

**3. To determine frequencies:** Frequencies are assigned to each unit according to command echelon. To find the frequency for a given net (for example: 1/77 Inf, A Co, 1st Plt), turn to the index (figure 1a) and find the parent organization item number, as in para 2 above. Turn to that item number (figure 2b) and look down the left-hand column until you find the unit you want to communicate with (A Co, 1st Plt). After finding the unit, look to the right under the correct time period (01) to find the right frequency (52.45).

**4. Item number identifiers.** Unknown station callsigns can be identified by the use of item number identifiers. Each station should know the two-letter identifier for its own net for each time period. To find your item number identifier, follow these steps:

**Step 1 -** Go to the index of your CEOI and find item numbers for both your unit and ITEM NUMBER IDENTIFIERS.

**Step 2 -** Turn to the correct item number for ITEM NUMBER IDENTIFIERS and read down the column under the appropriate time period until you find your unit's CEOI item number. Next, follow that line to the far left column to find your correct two-letter ITEM NUMBER IDENTIFIER. Use this number to identify yourself when entering a net in which you do not normally operate. This gives the other net your CEOI item number from which your station's identity can readily be determined.

**Example:**

You have just received a call from a unknown station. The individual identified himself using the callsign S9A17 and stated that his item number identifier is AB. The time period is 01, and the individual authenticated correctly when you challenged him. To identify the unknown station, follow this procedure:

**Step 1 -** Go to your index (figure 1b) and locate the item number for ITEM NUMBER IDENTIFIERS (20). Turn to item number 20 (figure 4),

and look down the left-hand column until you find the two-letter identifier, AB. Next, follow this line across the page to the column of item numbers under the correct time period (01) and read the item number of the unknown station (6A).

Step 2 - Turn to the CEOI item number (6A) (figure 2a). Look under the correct time period (01) for the first three characters of the unknown callsign (S9A). Reading over to the left-hand column, you find this to be the 1/77 INF BN.

Step 3 - To identify the last two characters of the unknown station callsign (17), go to the CEOI item for suffixes (2) (figure 3). Look down the left-hand column until you find the number 17. Read to the right to identify the unknown station as an S2.

In this manner, you have completely identified the unknown station as the S2, 1/77 INF.

**NOTE:** The CEOI extract and the performance measures section under the task: **USE KAL-61B, 1400 NUMERICAL CODE TO AUTHENTICATE TRANSMISSION AND ENCRYPT NUMBERS AND GRID ZONE LETTERS**, may be cut out and used as a training CEOI.

(PROTECTIVE MARKING)	
KTC 600 Series	1
ITEM	ITEM NO
INDEX	1
CDR QUICK REF MAJOR SUBOR ELMS AND CBT BNS	3
CALL SIGNS AND FREQS	3A
CDR QUICK REF DIV AND SUPPORT	3B
CDR QUICK REF 1ST BDE	3C
CDR QUICK REF 2ND BDE	3D
CDR QUICK REF 3RD BDE	3E
CDR QUICK REF DIVARTY	3F
CDR QUICK REF DISCOM	3G
CDR QUICK REF RATT	3H
CDR QUICK REF SSB VOICE	4
52ND INF DIV (MECH) CALL SIGNS AND FREQS	4A
DIV ADMIN	4B
DIV OPS/INTEL RATT	4C
DIV ADMIN/LOG RATT	4D
DIV TOC SSB VOICE	5
ATC CALL SIGNS AND FREQS	6
1ST BDE CALL SIGNS AND FREQS	6B
1-78 INF BN	6C
1-2 ARMD BN	6D
1ST BDE RATT	7
2ND BDE CALL SIGNS AND FREQS	7A
1-79 INF BN	
INDEX	1 of 4

Figure 1a.

(PROTECTIVE MARKING)	
KTV 600 Series	1
ITEM	ITEM NO
1-441 ADA BN CALL SIGNS AND FREQS	12
FAAR PLT	12A
1-441 ADA BN SSB VOICE	12B
52ND ENGR BN CALL SIGNS AND FREQS	13
52ND ENGR ADM PLT SSB VOICE	13A
52ND MP CO CALL SIGNS AND FREQS	14
52ND MI CO CALL SIGNS AND FREQS	15
52ND SIG BN CALL SIGNS AND FREQS	16
52ND AVN BN CALL SIGNS AND FREQS	17
AHC 52ND AVN BN	17A
AHC PLT'S	17B
GEN SPT CO 52ND AVN BN	17C
52ND ASA CO CALL SIGNS AND FREQS	18
52ND ASA CO RATT	18A
SPARE CALL SIGNS AND FM FREQS	19
SPARE CALL SIGNS AND FM FREQS	19A
SPARE CALL SIGNS AND VHF FREQS	19B
SPARE CALL SIGNS AND UHF FREQS	19C
SPARE CALL SIGNS AND HF FREQS	19D
PYROTECHNIC AND SMOKE SIGNALS	21
SIGNS AND COUNTERSIGNS	22
INDEX	3 of 4

Figure 1b.

(PROTECTIVE MARKING)					
KTV 600B		CALL SIGNS			
		02	03	04	05
1-77 INF BN	S8A	I2L	P9T	Z1N	I3L
HHC	B7J	G8X	K4H	O3E	K4C
A CO	M1C	R4M	N3X	T1K	K7X
1ST PLT	J7M	K2J	V6N	G8L	F1G
2ND PLT	V7D	R8O	E0P	K2W	W2R
3RD PLT	D2H	W5K	K1J	G5M	D5P
MORTAR PLT	C4B	J2A	P7K	E5Y	F5W
B CO	Y6Y	P0Z	L0Q	K6R	C6J
1ST PLT	P0F	B6R	X1A	P1U	R2N
2ND PLT	S2X	H7H	V8I	Y7C	G2V
3RD PLT	L7T	L7Q	Q7V	S5A	I4Z
MORTAR PLT	R9V	B7W	D1S	P7D	B2B
C CO	G1Q	J6N	E6F	M4B	A0T
1ST PLT	N7O	P9U	B6B	N5V	P7U
2ND PLT	B9S	Y6D	K2R	R7O	I6Y
3RD PLT	H8P	P7I	Z6L	B4Q	T1I
MORTAR PLT	A5L	Q2C	A8E	Y8F	V6D
CSC	COW	O4B	N7C	O6H	S4H
AT PLT	A2E	N9P	E4W	N2G	L6E
MORTAR PLT	J6Z	U2G	U6G	Q5Z	W0M
RECON PLT	E4G	B6F	R0Z	D0T	E8S
REDEYE SEC	J7I	Z0S	A6O	Q5J	U1K
GND SURVL SEC	G5U	L2Y	T8D	F1I	U4O
MEDEVAC	Q5J	A6I	V2S	W0P	O2O

Figure 2a.

(PROTECTIVE MARKING)					
KTV 600 B		FREQUENCIES			
		01	02	03	04
1-77 INF BN		01	02	03	04
1-77 INF CMD	52.800	61.950	35.050	61.550	60.700
1-77 INF A/L	49.300	64.200	31.500	39.250	41.200
A CO CMD	35.950	40.600	35.550	34.600	30.250
1ST PLT	52.450	52.550	47.900	53.150	51.700
2ND PLT	53.100	52.500	52.050	52.750	50.850
3RD PLT	47.500	53.450	52.350	52.550	52.150
MORTAR PLT	71.450	66.450	59.450	68.050	70.650
B CO CMD	44.850	56.750	71.850	55.200	56.250
1ST PLT	53.350	52.650	50.950	53.350	53.750
2ND PLT	50.150	48.800	53.100	52.350	52.450
3RD PLT	53.650	52.050	53.700	50.950	48.050
MORTAR PLT	49.150	49.050	40.950	71.200	62.550
C CO CMD	56.150	66.850	54.750	49.850	45.550
1ST PLT	50.450	53.100	51.200	52.650	53.250
2ND PLT	52.550	48.100	52.950	53.100	50.650
3RD PLT	51.600	48.700	53.350	53.500	52.100
MORTAR PLT	56.600	55.850	47.950	45.800	43.300
CSC CMD	57.800	34.900	34.250	35.850	61.450
AT PLT	54.850	65.650	35.350	49.300	66.250
MORTAR PLT	46.450	58.900	64.200	61.300	68.550
RECON PLT	71.850	55.900	72.900	39.500	72.550
REDEYE SEC	46.250	36.400	73.000	45.150	75.900
GND SURVL SEC	39.500	41.700	58.200	73.000	47.700
1-77 AJ/ALT 1	53.000	33.350	73.150	56.750	59.800
1-77 AJ/ALT 2	40.050	71.500	59.000	73.300	65.800
MEDEVAC P	35.200	43.800	48.500	69.000	73.150

Figure 2b.

(PROTECTIVE MARKING)	
KTV 600 B	
SUFFIXES	
01 TARGET ACQ OFF	31 TM/SQD/SEC/DET/TK 7
02 AID-DE-CAMP	32 LN OFF 4
03 C-E OFF	33 TM/SQD/SEC/DET/TK 8
04 MAINT OFF	34 ATSE
05 AIRCRAFT 12	35 FO/RECON/TACP 6
06 G3/S3 AIR	36 COMSEC OFF
07 MATERIEL OFF	37 TRANS/MOTOR OFF
08 AVLB SEC	38 FSE
09 G1/S1	39 EW OFF
10 MET	40 CHIEF OF STAFF/XO
11 ASA OFF	41 SURGEON/MED OFF
12 FO/RECON/TACP 1	42 FO/RECON/TACP 5
13 PLT/SEC/TEAM/LDR	43 ACE
14 AIRCRAFT 6	44 HQ COMDT
15 FO/RECON/TACP 3	45 FDC
16 FSCORD	46 TM/SQD/SEC/DET/TK 1
17 G2/S2	47 AIRCRAFT 1
18 AG	48 AME
19 SURVEY OFF	49 RADAR
20 FLT OPS	50 AIRCRAFT 10
21 AIRCRAFT 8	51 AIR DEFENSE OFF
22 RECOVERY VEH	52 CHAPLAIN
23 G3/S3	53 AIRCRAFT 5
24 IG	54 SPARE 9
25 PLT/SEC/TEAM SGT	55 ENGR OFF
26 LN OFF 3	56 NCS
27 TOC/CP	57 FO/RECON/TACP 2
28 SGM/CSM	58 AIRCRAFT 7
29 G4/S4	59 SPARE 8
30 NAICO	60 SPARE 2

Figure 3.

(PROTECTIVE MARKING)	
KTV 600 B	
ITEM NUMBER IDENTIFIERS	
01	02
03	04
05	06
07	08
09	10
AA 19A	3G 19A
AB 6A	10B 9B
AC 3H	4C 19D
AD 8	12A 3F
AE 3A	4A 12A
AF 3C	10A 3E
AG 3E	4D 7
AH 9F	13 10C
AI 7	7C 8D
AJ 6	10C 13
AK 18	3D 16
AL 17	10E 3
AM 10C	19C 10
AN 12	12 3D
AO 6B	19B 9A
AP 8D	19 19
AQ 9	8E 11A
AR 7D	15 12
AS 3G	9E 9
AT 7C	7A 17
AU 9B	3A 9F
AV 3F	3B 18A
AW 19B	8C 8B
AX 10A	18A 14
AY 5	11A 7A
AZ 16	17B 4D
13A	11A
12	19B
6	3B
7B	3A
6C	10E
9E	8E
11	16
3D	9D
10B	17B
4B	11B
9	5
13A	9
17B	5
13B	3
17C	3H
10E	9
11B	11
19C	3F
18A	17C
9F	17A
6A	9A
3H	6A
12	3H
4	8A
7C	17A
7	15
8C	3F
17D	13A
10	3
17B	19D

Figure 4.

## REFERENCES:

Unit CEOI

TEC Lesson 936-061-0140-F, CEOI, Part 1: How to use the CEOI

2-II-D-5.4

**TASK NUMBER: 113-571-2001**

---

**USE KAL-61B 1400 NUMERICAL CODE TO  
AUTHENTICATE TRANSMISSIONS AND  
ENCRYPT/DECRYPT NUMBERS AND  
GRID ZONE LETTERS**

---

**CONDITIONS:**

Given dates and times, a KAL 61B with KTC 1400 tables, pencil, paper, and the following items which may be simulated for training only: operational FM radios, a frequency, callsigns, and a sending station.

**Situation 1:** A contacted station which might be an imposter.

**Situation 2:** A station requests you to authenticate two phonetic letters.

**Situation 3:** A requirement to encode specific grid coordinates and transmit them within an otherwise clear text (uncoded) message.

**Situation 4:** A station, while transmitting, says the words "I set" followed by 8, 10, or 12 phonetic letters.

**STANDARDS:**

Without error, select the right KTC 1400 for the time period given:

**Situation 1:** Within 15 seconds (not counting time taken by the other station), transmit, using proper radio procedure, a two-letter challenge, and from the reply determine whether or not the station responded correctly. (If station takes more than 5 seconds to respond, challenge again.)

**Situation 2:** Within 15 seconds, using the correct radio procedure, respond to the challenge with correct authentication. (If immediately challenged again, respond correctly within 5 seconds.)

**Situation 3:** Encode the specific grid coordinates without error and transmit them using correct radio procedures.

**Situation 4:** Decode the words after "I set" without error.

**PERFORMANCE MEASURES:**

## NAO 3B

## TO SET UP FOR ENCRYPTING

**Step 1.** Randomly select any two letters (except Z) for message "SET INDICATOR" (SI). EXAMPLE: CP.

**Step 2. Find the first letter "C" of the SI in LINE INDICATOR COLUMN (1).**

**Step 3.** Find the second letter “p” of SI in the line indicated by the first letter. Letter to the right of second SI letter is the SET LETTER.

**NOTE: If the second SI letter is the last letter in the line, then the first letter in the same line will be the SET LETTER.**

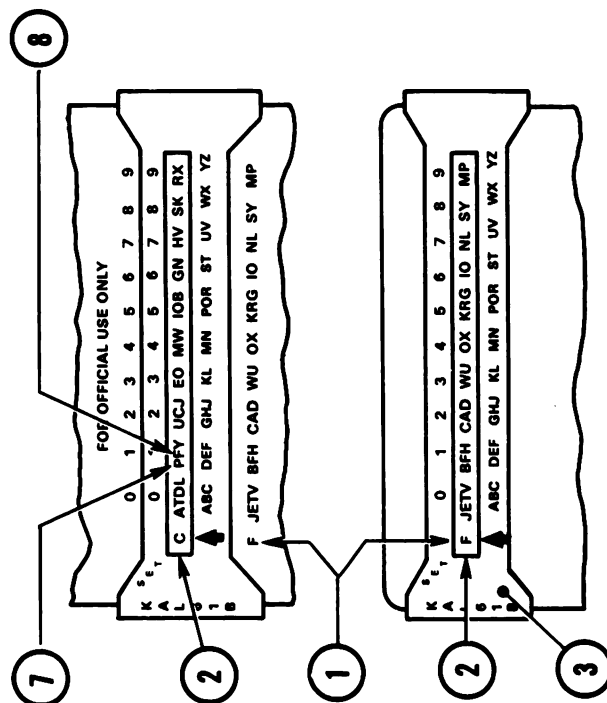
**Step 4. Find SET LETTER "F" in LINE INDICATOR COLUMN.**

**Step 5. Position READER GUIDE over line indicated by SET LETTER "F". Device is now ready for encrypting.**

## 1. TO SET UP FOR ENCRYPTING.

**(PROTECTIVE MARKING)**

**NAO 3B**



**KAL 61 set up for encrypting.**

1. Line Indicator Column  
2. Set Letter/First Letter of Set Indicator  
3. Reader Guide  
7. Second Letter of Set Indicator  
8. Set Letter

**(PROTECTIVE MARKING)**



## NAO 3B

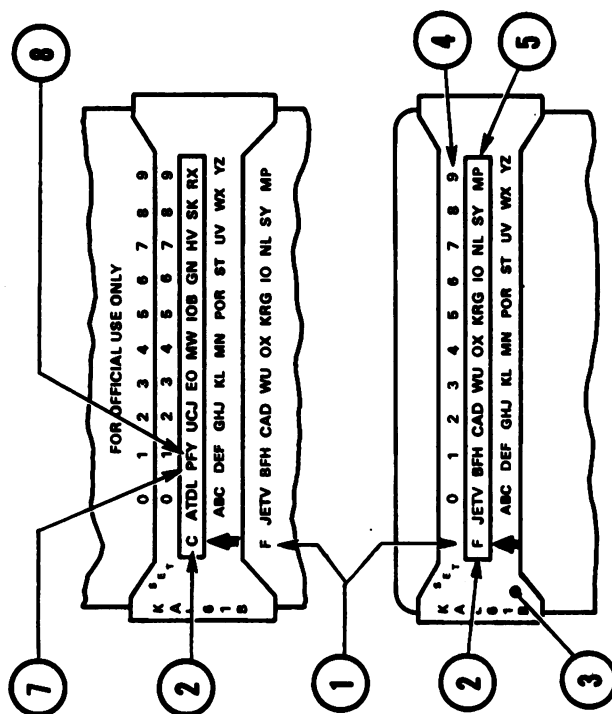
**TO ENCRYPT NUMBERS**

Set KAL 61 for encrypting as indicated in Section 1.

**Step 1.** Find number to be encrypted in **PLAINTEXT NUMBERS (4)** on **READER GUIDE (3)**. **EXAMPLE:** 572938.

**Step 2.** Substitute for each number one of the **CIPHER LETTERS (5)** grouped in the set line immediately below the number to be encrypted. Continue to substitute letters from the same **SET** line until all numbers for that group are encrypted. **EXAMPLE:** RNAMUS is one possibility. By using variants, others are possible.

**NOTE:** Numbers will be encrypted one at a time in the same order they appear in the message. A different cipher letter will be used for repeated numbers. If there are more than 15 numbers to be encrypted in the same message, one **SET INDICATOR** will be used for the first 15 numbers and a different **SET INDICATOR** for each succeeding group of 1 to 15 numbers. This must be done because the encrypting of more than 15 numbers in the same **SET INDICATOR** can seriously weaken the security of the system.

**2. TO ENCRYPT NUMBERS.****(PROTECTIVE MARKING)**

- 3. Reader Guide
- 4. Plaintext Numbers
- 5. Cipher letters

**(PROTECTIVE MARKING)**

## NAO 3B

### TO ENCRYPT GRID ZONE LETTERS

**Step 1.** Find first grid zone letter to be encrypted in PLAINTEXT LETTERS (6). EXAMPLE: N.

**Step 2.** Substitute for that letter the cipher letter located in SET line directly above the letter to be encrypted. EXAMPLE: X.

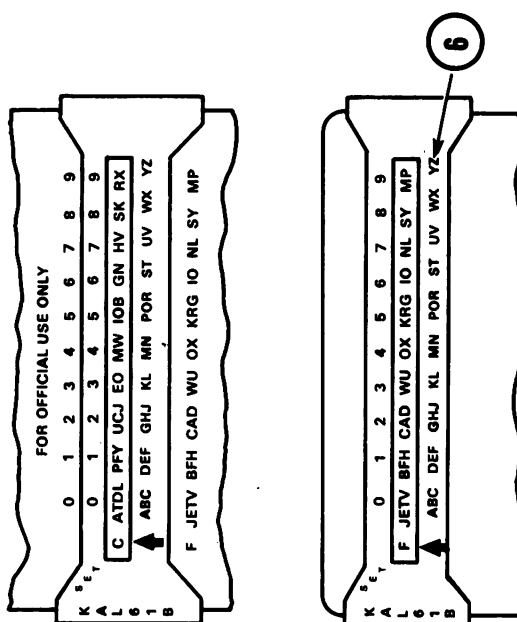
**Step 3.** Find the second grid zone letter to be encrypted in PLAINTEXT LETTERS (6). EXAMPLE: R.

**Step 4.** Substitute for second letter the cipher letter located in SET line directly above the letter to be encrypted. EXAMPLE: G. The same SET line will be used to encrypt both the grid zone letters and the coordinates.

**NOTE:** Grid Zone letters will be included in messages when they are necessary to the understanding of such messages. NO OTHER LETTERS WILL BE ENCRYPTED. If necessary to preclude misunderstanding, a statement may be made that grid zone letters are included in the message.

### 3. TO ENCRYPT GRID ZONE LETTERS.

(PROTECTIVE MARKING)



6. Plaintext letters for UTM Grid Zone Designators

(PROTECTIVE MARKING)

## NAO 3B

**ARRANGEMENT AND TRANSMISSION OF MESSAGES**

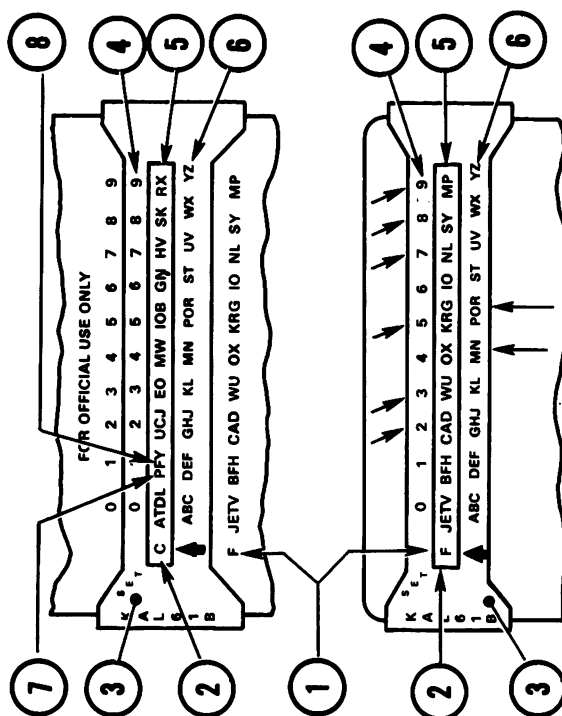
This system is designed to be used with plain text. Therefore, most messages using this system will include both encrypted portions and plaintext portions. The encrypted portions of your message will be arranged as follows:

- a. First two letters will be the SET INDICATOR letters. (NEVER TRANSMIT THE SET LETTER). EXAMPLE: CP. (This is transmitted as "I set CHARLIE PAPA".)
- b. If grid zone letters are included, the third and fourth letters will be encrypted grid zone letters. EXAMPLE: XG. (This is transmitted as "X-RAY GOLF".)
- c. Remaining letters (including third and fourth if grid zone letters are not included) will be encrypted numbers. EXAMPLE: RNAMEUS. (This is transmitted "ROMEO NOVEMBER ALFA MIKE UNIFORM SIERRA".)

NOTE: An encrypted, six-digit location which includes grid zone letters will consist of ten letters, including the SI which is always the first two letters. The entire encrypted location would be transmitted as "I set CHARLIE PAPA, (pause), X-RAY GOLF ROMEO NOVEMBER ALFA MIKE UNIFORM SIERRA".

**4. ARRANGEMENT AND TRANSMISSION OF MESSAGES****(PROTECTIVE MARKING)**

## NAO 3B



1. Line Indicator Column
2. Set Letter/First Letter of Set Indicator
3. Reader Guide
4. Plaintext Numbers
5. Cipher Letters
6. Plaintext Letters for UTM Grid Zone Designators
7. Second Letter of Set Indicator
8. Set Letter

**(PROTECTIVE MARKING)**

# NAO 3B

## TO DECRYPT

Example encrypted location: CP XG RNAMEUS. (Transmitted as, "I set CP (pause) XG RNAMEUS".)

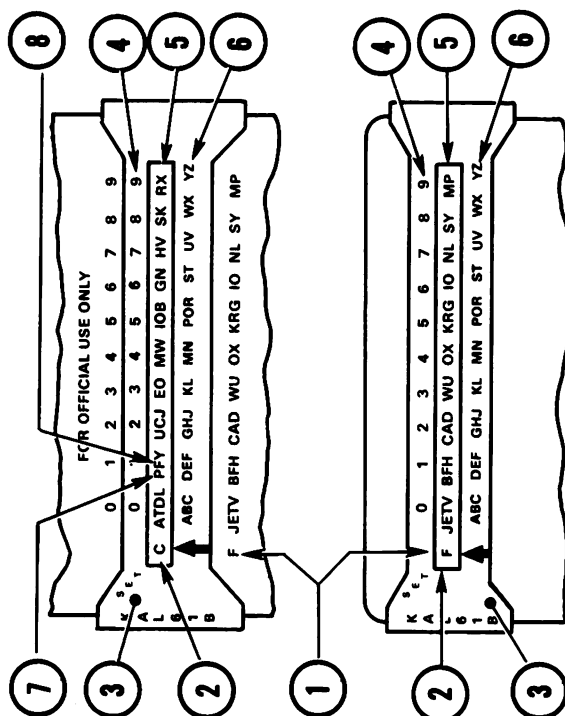
**Step 1.** Find SET LETTER "F" using the SI "CP" as described in "TO SET UP FOR ENCRYPTING" Steps 2 and 3.

**Step 2.** Decipher message beginning with the third letter "X" by substituting plaintext letters/numbers on the READER GUIDE (3) for the cipher letters.

## 5. TO DECRYPT

(PROTECTIVE MARKING)

# NAO 3B



1. Line Indicator Column
2. Set Letter/First Letter of Set Indicator
3. Reader Guide
4. Plaintext Numbers
5. Cipher Letters
6. Plaintext Letters for UTM Grid Zone Designators
7. Second Letter of Set Indicator
8. Set Letter

(PROTECTIVE MARKING)

## NAO 3B

**NOTE: AUTHENTICATION MAY BEST BE ACCOMPLISHED BY MOVING READER GUIDE COMPLETELY OUT OF THE WAY OR ELSE POSITIONING IT SO AS NOT TO OBSCURE REPLY LINE.**

### TO AUTHENTICATE

#### Challenge and Reply

**Step 1.** Select any two letters (except Z) at random for challenge. **EXAMPLE:** KV.

**Step 2.** Find first letter "K" of challenge in the **LINE INDICATOR COLUMN**.

**Step 3.** Find second letter "V" of challenge in line indicated by first letter. The correct reply (E) is the cipher letter directly under the second letter "V" of the challenge.

**NOTE:** If the first letter of the challenge is "Y" indicating the last line of the table, the reply should be taken from the "A" line and will be the letter in the same position as the second letter of the challenge in the "Y" line. If challenged party does not reply within 5 seconds but does reply correctly, challenge that party again using a different challenge.

**(PROTECTIVE MARKING)**

## NAO 3B

**NOTE:** The called party will make the first challenge. Both the person making the challenge and the person being challenged must find the correct reply. The party making the call may then counter-challenge the called party using a different challenge.

#### Transmission Authentication

One hundred Transmission Authentication digraphs have been provided in this system. They are to be used in cases where authentication is required and it is not possible or desirable that the receiving station reply. The Transmission Authentication table consists of ten numbered columns containing ten digraphs each. Columns have been numbered to make the assignment of Transmission Authentication digraphs easier. Numbered columns should be assigned by the Controlling Authority to selected communications nets within his cryptonet. Authentication digraphs within the numbered columns should be used only once, and only within the Controlling Authority's net. When it becomes necessary to use Transmission Authentication, the first or next unused digraph in the assigned column will be used.

### 6. TO AUTHENTICATE.

**(PROTECTIVE MARKING)**

**NAO 3B**

**SECURITY THOUGHTS**

Following are common rules to achieve security:

- Change message set after 15 numbers are encrypted.
- Encrypt brevity values.
- Never encrypt or decrypt a message and then repeat it in plain language.
- Avoid the encrypting of information known to the enemy.
- Make all transmissions as short as possible.
- Remember that anyone can listen to your transmission.

**INSTRUCTIONS FOR INSERTING CIPHER TABLE**

IN KAL 61

- Unfasten flap at the bottom of device and bend back out of the way.
- Slide the cipher table face up under the lips at the top and sides of the device.
- Before refastening the flap, adjust cipher table so that the top register marks (+) at the bottom of the table will align precisely with the snaps when the flap is fastened.

**TRANSMISSION AUTHENTICATION TABLE**

01	02	03	04	05	06	07	08	09	10
HA	VX	YM	WT	MY	OE	JR	AY	RB	IP
DM	VB	ZF	MP	OV	XI	TX	TF	WE	VH
JP	YQ	QL	MA	SS	JZ	SG	XJ	EX	AO
SQ	VC	OR	IS	BM	HN	HB	VN	HW	ZK
NK	UD	FU	CM	YF	YN	HM	NF	VK	EG
OD	CC	WA	UF	OC	OQ	MW	GD	CD	XA
SW	MQ	OP	ES	YL	ZY	SV	IB	AR	ZL
RG	KM	RL	GO	OF	OK	BX	II	ND	EA
MM	OH	QK	RZ	NE	ZT	AN	FG	GB	PB
IF	DC	UV	SB	FA	VZ	MD	BD	XE	HR

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**(PROTECTIVE MARKING)**

**NAO 3B**

0	1	2	3	4	5	6	7	8	9
A	VDFJ	AUM	IHC	EL	XW	YNO	GT	PS	RB
B	CIFN	WKV	BQ	ES	RH	YOJ	XL	AT	UG
C	OSXJ	CFY	QGD	RT	UA	VIN	KH	EM	WP
D	IOBS	JKQ	FEG	DP	MIN	XWL	CH	TA	VU
E	KLPA	MJX	QDY	CH	CW	VFE	BT	RN	UI
F	VUCI	EPA	NXY	TH	BQ	QGJ	LK	WR	FM
G	NYAO	UFK	GJW	QI	DT	BLH	ES	WR	DS
H	KHIV	GYC	RPS	FO	JX	QWA	TU	DB	EM
I	BWOA	DPJ	UGY	NH	RE	VCI	TS	LM	FQ
J	PCWX	RQF	JVM	OY	HS	EGD	BN	KT	UA
K	CQPK	ASM	TDJ	WX	IH	NUR	GB	OL	YE
L	BWRF	JPC	QON	AV	HG	IML	DU	SK	YX
M	HQIA	XLC	FVB	SK	OJ	MUD	RW	YN	GE
N	CWQF	KJS	XHP	AE	TN	UGY	VL	MD	RI
O	NWFD	QBS	RJX	PH	YT	ICM	OG	AV	LU
P	PAFT	NSC	QRM	WX	HKI	OE	YJ	UB	LV
Q	SNGD	JTP	WYI	CR	BE	IOV	MX	FH	QK
R	AMRH	NJG	QUY	SE	IO	KDL	PV	XC	WB
S	YWGS	VXE	IDC	KQ	OA	TPH	BU	JR	ML
T	BCDL	FOR	AUT	NV	GW	SKX	PI	ME	HQ
U	RMQD	WVS	YJX	TG	UL	FEK	PB	OA	NH
V	BOKA	HXG	SLC	PD	JT	EFQ	IV	WM	RN
W	ASLV	YVD	TRO	BE	CI	PFX	HG	MN	JQ
X	DLTV	NEQ	PAS	XB	OC	MHJ	KW	RF	IG
Y	XSIC	YGP	NFW	HE	KL	JAR	VO	QD	TM

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**7. SAMPLE TABLE**

**(PROTECTIVE MARKING)**

**NAO 3B**

**SECURITY THOUGHTS**

Following are common rules to achieve security:

- Change message set after 15 numbers are encrypted.
- Encrypt brevity values.
- Never encrypt or decrypt a message and then repeat it in plain language.
- Avoid the encrypting of information known to the enemy.
- Make all transmissions as short as possible.
- Remember that anyone can listen to your transmission.

**INSTRUCTIONS FOR INSERTING CIPHER TABLE**

IN KAL 61

- Unfasten flap at the bottom of device and bend back out of the way.
- Slide the cipher table face up under the lips at the top and sides of the device.
- Before refastening the flap, adjust cipher table so that the top register marks (+) at the bottom of the table will align precisely with the snaps when the flap is fastened.

**REFERENCE:**

**TC 24-2, The Automated "CEOI", Dec 75 (all)**

**NOTE: NEVER self-authenticate using challenge and reply authentication. If self-authentication is required, use one of the two letter digraphs found in the Transmission Authentication Table (KTC 1400) assigned to your unit.**

## TASK NUMBER: 113-571-2002

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**ENCODE AND DECODE MESSAGES USING A  
KTC-600 TACTICAL OPERATIONS CODE**


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**CONDITIONS:**

Given dates and times, CEOI, tactical operations code KTC-600, paper, pencils, and a message to be encoded or three-letter code groups to be decoded.

**STANDARDS:**

Encode or decode the message, without error, within 30 seconds per code group or word/phrase.

**PERFORMANCE MEASURES:**

1. **Use of code sets.** Each set of the KTC-600 tactical operations code is effective for a given time frame, not to exceed 48 hours. Time of change will be directed in the CEOI (could be days of the month or days of any given operation). Sets are used as follows:

**EXAMPLE ONLY**

<b>SET</b>	<b>EFFECTIVE DAYS (of the month or operation as directed by the CEOI)</b>
<b>1</b> .....	<b>1 and 2</b>
<b>2</b> .....	<b>3 and 4</b>
<b>3</b> .....	<b>5 and 6</b>
<b>4</b> .....	<b>7 and 8</b>

**2. To encode.**

a. After writing out your message in plain text, turn to the code set used on that day (see example above; on the 5th day of the month (or operation), you would use set 3).

b. The encoded portion of the operations code is made up of words and phrases commonly used in tactical operations which are arranged in alphabetical order as in a dictionary. To the left of each is a three-letter code group which is the code for that word or phrase.

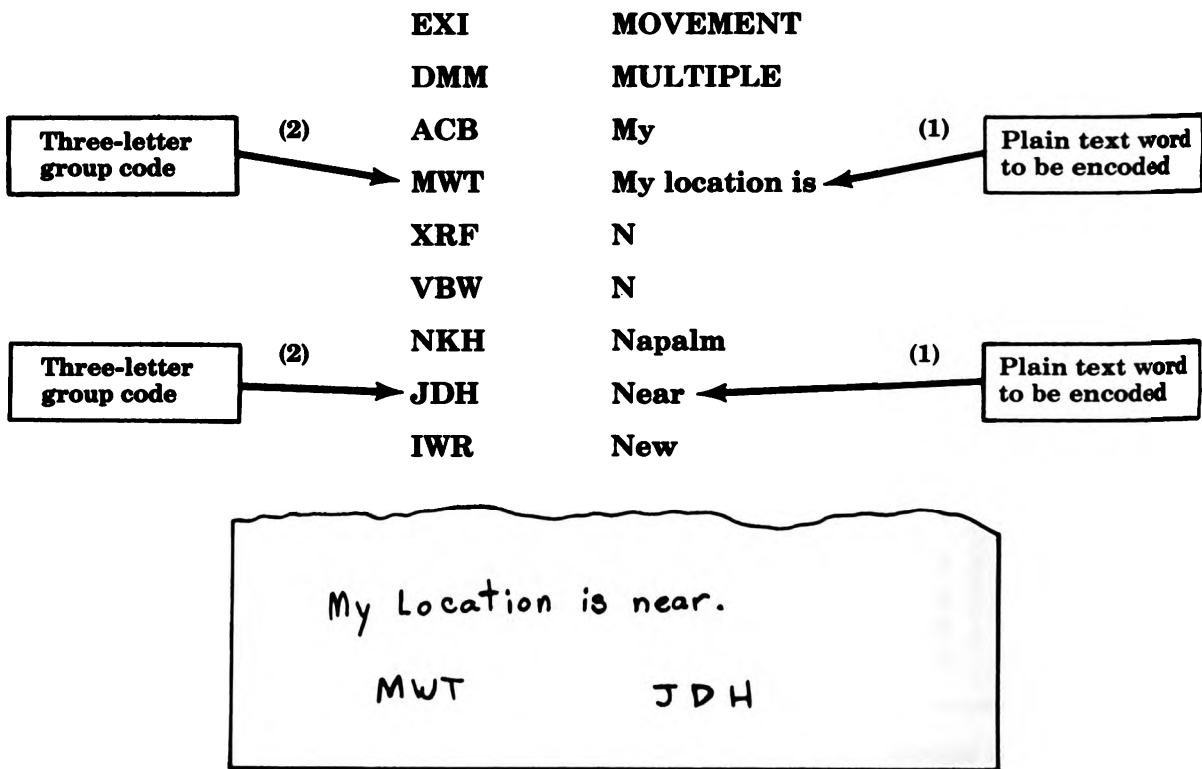
c. Procedure to encode words or phrases:

(1) Find the word or phrase to be encoded.

- (2) Identify the three-letter code group located to the left of that word or phrase.
- (3) Write that three-letter code group under the word or phrase where you have written out the message to be encoded.
- (4) Repeat this procedure until the whole message is encoded.

(EXAMPLE ONLY)

Message: "My location is near."



**NOTE:** Two code groups are provided for spelling a word that contains double letters. Do not use identical code groups side by side when you are spelling a word that contains double letters.

**3. To decode.**

- a. After receiving and writing down the encoded message, check the CEOI and turn to the code set in effect for that day.

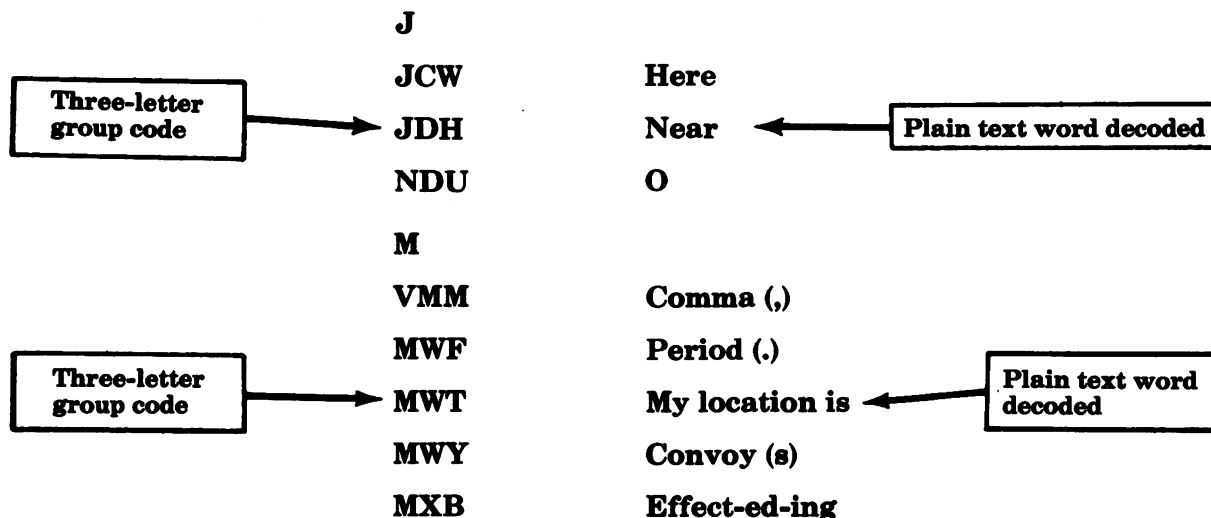


b. The decode portion of the operations code is made up of a column of three-letter code groups in alphabetical order (AAO, ABL, ABY, etc.) with a word or phrase to the right of each group.

c. To decode a received message, find the code group and write the word/phrase next to it under that group in the encoded message which you copied.

(EXAMPLE ONLY)

Coded Message: "MWT JDH"



MWT                  JDH

My Location is near.

**NOTE:** You can save some time when encoding or decoding by going in alphabetical order. When encoding, look up all words/phrases starting with A, then B, etc. When decoding, look up all code groups beginning with A, then B, etc.

#### 4. Radio procedure.

a. After contact is established, the station sending the encoded message uses the following prowords/procedures.

(1) "Message". Lets the receiving station know that a message is going to be sent THAT REQUIRES RECEIVING STATION to copy.

(2) "Groups". The number of groups in the message is provided so that the receiving station can check his copy. The receiving station should write this number down.

(3) Groups are transmitted phonetically (that is, each letter is pronounced as a word, as given in the military phonetic alphabet). Transmission should be slow, with a pause between each group.

**EXAMPLE:** If station F07 is going to transmit the message, "Execute plan B" to station F26 and the encoded message is "BCA ONM ZYX," the transmission would be: (-- indicates a pause)

(sending station) "FOXTROT TOO SIX -- THIS IS FOXTROT ZERO SEVEN -- MESSAGE - OVER"

(receiving station) "FOXTROT TOO SIX -- OVER"

(sending station) "GROUPS THREE -- "

<u>BRAH-VOH</u>	<u>CHAR-LEE</u>	<u>AL-FAH</u>
-- <u>OSS-CAH</u>	<u>NO-VEM-BER</u>	MIKE
-- <u>ZOO-LOO</u>	<u>YANG-KEY</u>	<u>ECKS-RAY</u>
-- OVER		

b. After the message is received and copied, and before it is decoded, the following procedures and prowords may be used:

(1) "Interrogative groups". Used by the receiving station when his group count is not the same as the sending station told him it would be. The receiving station's group count follows the word "groups".

(2) "Correct, out". Used by the sending station when the receiving station's interrogative group count is correct.

(3) "Groups" followed by a series of phonetic letters. Used by the sending station when the interrogative group count is wrong. The right group count follows the word "groups" and the first letter of each group is sent again. The receiving station checks these letters against the message he copied and finds his mistake.

(4) "Say again." Used by the receiving station to ask the sending station to retransmit a group(s) not received. The number of the group missed is put in the blank (Example: "Say again five" means that the sending station should resend the fifth group in the message).

c. Once the message has been decoded and a word (or all of the message) does not make sense, the receiving station should:

(1) Check to see if he has used the right code set.

(2) If the right code set was used, the receiving station should recontact the sending station and have him check the code group (or message) by using the pro-word "verify." (Examples: "Verify ONM" if ONM when decoded does not make sense; or "Verify message" if the whole message does not make sense.) The sending station then encodes and sends that portion again.

**NOTE:** Each set in the operations code has "spares" assigned. These spares can be used if all stations are informed of their meaning in advance. A word not included in the code or an entire message may be assigned to a "spare" group, or be spelled out using the letters listed in the operations code for that set.

#### **REFERENCES:**

Unit CEOI (Communications-Electronic Operating Instructions)  
(Classification)

TEC Lesson 936-061-0109-F, RTP: Part 2, Writing down messages received by radio

TEC Lesson 936-061-0111-F, RTP: Part 4, Preparing messages to be sent

TEC Lesson 936-061-0112-F, RTP: Part 5, Sending & Receiving Messages

**NOTE:** This instruction is not classified insofar as explaining encoding and decoding messages.



## TASK NUMBER: 113-571-1003

## ESTABLISH AND ENTER OR LEAVE A RADIO NET

## CONDITIONS:

1. **Situation 1:** Given an operational tactical FM radio set, the appropriate CEOI extracts, KAL 61 and KTC 1400, two or more stations, and a requirement to establish a radio net.

2. **Situation 2:** Given you are operating in an established radio net, appropriate CEOI extracts, KAL 61 and KTC 1400, and a requirement to enter a radio net in which you do not normally operate.

## STANDARDS:

1. **Situation 1:** Open the net for traffic by transmitting the net callsign and the additional calls required to get a responding call to the net control station (NCS).

2. **Situation 2:** Using the appropriate CEOI extract, determine the frequency and callsigns for the net you are to enter and your item number identifier, then request permission to leave your net and enter that net.

## PERFORMANCE MEASURES:

1. When establishing a radio net, the following actions must be accomplished:

a. Extract appropriate callsigns, suffixes, and frequency from the CEOI.

b. Prepare and operate the appropriate FM radio set.

c. Identify the net structure and determine the answering sequence, and make the appropriate response to the individual stations (figure 1).

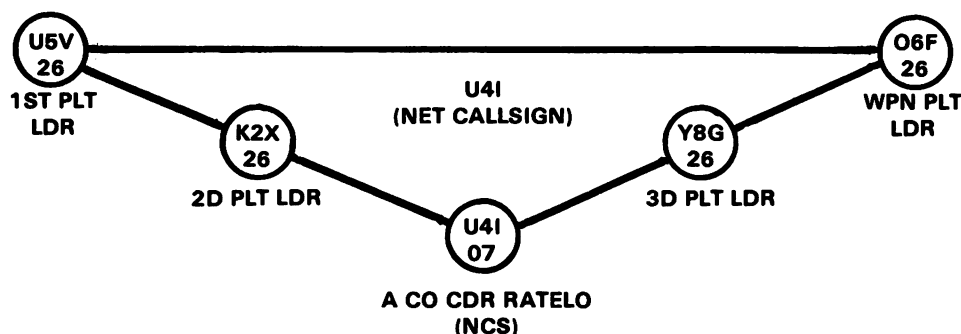


Figure 1.

(1) Establishing a net.

(a) Proper control by the NCS and adherence to operating rules by subordinate stations will enable a radio net to begin, maintain, and exchange messages with minimum delay. The use of procedure as prescribed herein must be followed when establishing a net.

EXAMPLE: When ready to establish the net, U4I07 transmits: U4I - THIS IS U4I07 - OVER.

(b) Each subordinate station then answers the call in alphabetical-numerical order according to callsigns.

U4I07 - THIS IS 06F26 - OVER

U4I07 - THIS IS Y8G26 - OVER

U4I07 - THIS IS U5V26 - OVER

U4I07 - THIS IS K2X26 - OVER

(c) The NCS now calls the net to inform all stations that their transmissions were received satisfactorily, and that he has no messages for them.

U4I - THIS IS U4I07 - ROGER - OUT

(2) Upon direction of the NCS, provided no confusion will result, callsigns other than the net callsign may be abbreviated by omitting their first two characters.

(3) All stations in the net should be prepared to authenticate when challenged.

(4) If any stations in the net do not answer the net callsign, the NCS will make individual calls to those stations in an attempt to establish communication.

(5) If any station in the net is unable to communicate with the NCS due to faulty equipment or unsuitable location, a report will be made to the NCS as soon as possible by means other than radio.

2. When entering a net in which you do not normally operate, the following procedure normally will be used:

Step 1. Request permission from your NCS to leave your assigned radio net.

Step 2. Go to the index of your CEOI and find the Item Number Identifier item number; turn to that item number and determine your two-letter identification using the correct time period.

Step 3. Using your CEOI index, locate the net you wish to enter, and turn to that item number; obtain the NCS callsign and the callsign of the station that you wish to send a message to.

Step 4. Determine the correct frequency using the CEOI for the net you are to enter.

Step 5. Call the NCS station for the net for which you wish to enter and request permission to enter the net.

**NOTE: Before transmitting, monitor the frequency to insure you do not cut in on someone else's transmission.**

Step 6. The NCS will require you to authenticate prior to giving you permission to enter the net. After permission is granted to enter the net, send your message.

Step 7. After sending your message, request permission to leave that net from the NCS. Upon receiving permission to leave the net, call your NCS and request permission to reenter the net.

**EXAMPLE: "T3F07" wishes to enter a net which is controlled by "R7G28."**

**ROMEO SEVEN GOLF TOO AIT - THIS IS TANGO TREE FOXTROT ZERO SEVEN - REQUEST PERMISSION TO ENTER THE NET - OVER**

**TANGO TREE FOXTROT ZERO SEVEN - THIS IS ROMEO SEVEN GOLF TOO AIT - AUTHENTICATE --- --- OVER**

**ROMEO SEVEN GOLF TOO AIT - THIS IS TANGO TREE FOXTROT ZERO SEVEN - I AUTHENTICATE ---- --- OVER**

**TANGO TREE FOXTROT ZERO SEVEN - THIS IS ROMEO SEVEN GOLF TOO AIT - ROGER - IDENTIFY YOUR STATION - OVER**

**ROMEO SEVEN GOLF TOO AIT - THIS IS TANGO TREE FOXTROT ZERO SEVEN - REFER TO ALPHA CHARLIE - OVER**

**TANGO TREE FOXTROT ZERO SEVEN - THIS IS ROMEO SEVEN GOLF TOO AIT - ROGER - PERMISSION GRANTED TO ENTER THE NET - OUT**

3. Any station desiring to leave a net simply requests permission from the NCS.

## **REFERENCES:**

**FM 24-1, Combat Communications, Sep 76 (app N, pages N-1 thru N-3, N-9 thru N-14)**

**TC 24-2, Communications-Electronics Operation Instructions, Dec 75 (part 2, pages 10 thru 11; part 5, pages 23 thru 42)**  
**ACP-125 (D), Communications Instructions -- Radio-Telephone Procedure, Jul 70 (chap 3, pages 3-1 and 3-3 thru 3-25, para 301 thru 321)**

**TEC Lesson 936-061-0113-F, RTP: Part 6, Entering and Leaving a Radio Net and Authenticating**





**TASK NUMBER: 113-571-1001**

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**TRANSMIT AND RECEIVE A RADIO MESSAGE**

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**CONDITIONS:**

**Situation 1:** Given KAL 61 and KTC 1400, a correctly installed and operational FM radio (vehicular or portable) operating in a net on a designated frequency, and the requirement to transmit a written or oral message to a designated station using correct radio procedures.

**Situation 2:** Given KAL 61 and KTC 1400, a pencil, paper, a correctly installed and operational FM radio (vehicular or portable) operating in a net on a designated frequency, and the requirement to receive a radio transmission from another station that is either clear text, coded, or a combination of clear text and code.

**STANDARDS:**

1. Transmit and receive all messages using the correct PROWORDS.
2. Transmit all numerals phonetically as shown in paragraph 2 of the performance measures.
3. Receive a radio transmission by correctly writing the message down and relaying to addressee, or relaying the message orally, word for word as received, to the addressee.
4. Transmit a message, using correct radio procedure and transmit the message as written or stated.
5. State the correct procedures to use if you are being jammed.

**PERFORMANCE MEASURES:**

1. Transmit PROWORDS where their intended meanings are appropriate as listed below:

**PROWORDS LISTED ALPHABETICALLY**

<b>PROWORD</b>	<b>EXPLANATION</b>
<b>ALL AFTER</b>	The portion of the message to which I have reference is all that which follows . . . .
<b>ALL BEFORE</b>	The portion of the message to which I have reference is all that which precedes . . . .
<b>AUTHENTICATE</b>	The station called is to reply to the challenge which follows . . . .

PROWORD	EXPLANATION
AUTHENTICATION IS	The transmission authentication of this message is . . . .
BREAK	I hereby indicate the separation of the text from other portions of the message.
CORRECTION	An error has been made in this transmission. Transmission will continue with the last word correctly transmitted.
GROUPS	This message contains the number of groups indicated by the numeral following . . . .
I AUTHENTICATE	The group that follows is the reply to your challenge to authenticate . . . .
I SAY AGAIN	I am repeating transmission or portion indicated.
I SPELL	I shall spell the next word phonetically.
MESSAGE	A message which requires recording is about to follow. (Transmitted immediately after the call. This proword is not used on nets primarily employed for conveying messages. It is intended for use when messages are passed on tactical or reporting net.)
MORE TO FOLLOW	Transmitting station has additional traffic for the receiving station.
OUT	This is the end of my transmission to you and no answer is required or expected.
OVER	This is the end of my transmission to you and a response is necessary. Go ahead; transmit.
RADIO CHECK	What is my signal strength and readability, i.e., how do you hear me.
ROGER	I have received your last transmission satisfactorily, loud and clear.
SAY AGAIN	Repeat all of your last transmission. Followed by identification data means "Repeat—(portion indicated)."
THIS IS	This transmission is from the station whose designator immediately follows.
TIME	That which immediately follows is the time or date-time group of the message.
WAIT	I must pause for a few seconds.

**PROWORD****EXPLANATION****WAIT-OUT**

I must pause longer than a few seconds.

**WILCO**

I have received your signal, understand it, and will comply. To be used only by the addressee. Since the meaning of ROGER is included in that of WILCO, the two prowords are never used together.

**WORD AFTER**

The word of the message to which I have reference is that which follows . . . .

**WORD BEFORE**

The word of the message to which I have reference is that which precedes . . . .

2. Transmit isolated letters and abbreviations; phonetically spell unusual or difficult words using the phonetic alphabet as listed below: (See sample message transmission for correct procedure.)

<b>A</b> ALFA (AL FAH)	<b>B</b> BRAVO (BRAH VON)	<b>C</b> CHARLIE (CHAR LEE)	<b>D</b> DELTA (DELL TAH)
<b>E</b> ECHO (ECK OH)	<b>F</b> FOXTROT (FOKS TROT)	<b>G</b> GOLF (GOLF)	<b>H</b> HOTEL (HON TELL)
<b>I</b> INDIA (IN DEE AH)	<b>J</b> JULIETT (JEW LEE ETT)	<b>K</b> Kilo (KEY LOW)	<b>L</b> LIMA (LEE MAH)
<b>M</b> MIKE (MIKE)	<b>N</b> NOVEMBER (NO VEM BER)	<b>O</b> OSCAR (OSS CAH)	<b>P</b> PAPA (PAH PAH)
<b>Q</b> QUEBEC (KEM BECK)	<b>R</b> ROVER (ROW ME OH)	<b>S</b> SIERRA (SEE AIR RAH)	<b>T</b> TANGO (TANG GO)
<b>U</b> UNIFORM (YOU NEE FORM)	<b>V</b> VICTOR (VIK TAH)	<b>W</b> WHISKEY (WISS KEY)	<b>X</b> XRAY (ECKS RAY)
<b>Y</b> YANKEE (YANG KEE)	<b>Z</b> ZULU (ZOO LOO)	<b>1</b> WUN	<b>2</b> TOO
<b>3</b> TREE	<b>4</b> FOUR - or	<b>5</b> FI - YIV	<b>6</b> SIX
<b>7</b> SEV - en	<b>8</b> AIT	<b>9</b> NIN - or	<b>0</b> ZE - RO

Accented syllables are underlined.

3. Numbers will be transmitted digit by digit except that exact multiples of thousands may be spoken as such. However, there are special cases, such as identifying a specific code group in a coded message, when the normal pronunciation of numerals is prescribed; for example, 17 would then be "seventeen."

NUMERAL	SPOKEN AS
44	<u>FOW-ER FOW-ER</u>
90	<u>NIN-ER ZE-RO</u>
136	WUN TREE SIX
500	FIFE ZE-RO ZE-RO
1200	WUN TOO ZE-RO ZE-RO
1478	WUN <u>FOW-ER</u> <u>SEV-EN</u> AIT
7000	<u>SEV-EN</u> TOU-SAND
16000	WUN SIX TOU-SAND
812681	AIT WUN TOO SIX AIT WUN

**SAMPLE MESSAGE:** ROAD TO TILLEPS WILL BE FLOODED BY 1800 HRS. INITIATE PLAN B.

**TRANSMITTING STATION CALLSIGN:** Z8C28

**RECEIVING STATION CALLSIGN:** U4I07

———— (SAMPLE TRANSMISSION) ————

**(TRANSMITTING STATION):**

INDIA ZERO SEVEN - THIS IS CHARLIE TOO  
AIT - MESSAGE - OVER

**(RECEIVING STATION):**

INDIA ZERO SEVEN - OVER

**(TRANSMITTING STATION):**

ROAD TO TILLEPS - I SPELL - TANGO INDIA LIMA LIMA ECHO  
PAPA SIERRA - TILLEPS - WILL BE FLOODED BY WUN AIT ZERO  
ZERO HOTEL ROMEO SIERRA - PERIOD - INITIATE PLAN BRAVO -  
PERIOD - OVER

**(RECEIVING STATION):**

WILCO - OUT

4. Jamming is intentional radio interference caused by the enemy. If the enemy has the capability to jam the frequencies used, each radio operator should:

- a. Learn to recognize enemy jamming and report details to the supervisor of the radio station.
- b. Learn to readjust the set to minimize the effects of enemy jamming.
- c. Operate with minimum power until jammed – then increase the power.
- d. Shift to alternate frequencies and callsigns as directed.
- e. Authenticate all transmissions.
- f. KEEP OFF THE AIR as much as possible. Transmit only when absolutely necessary.
- g. Observe radio discipline at all times.
- h. Keep transmissions as short as possible.
- i. Keep calm, keep trying, and keep operating when the circuit is jammed.
- j. Do not mention you are being jammed on the radio.

## REFERENCES:

FM 24-1, Combat Communications, Sep 76 (app N, pages N-1 thru N-5, N-9 thru N-14)

ACP-125 (D), Communications Instructions -- Radio-Telephone Procedures, Jul 70 (chap 3, page 3-1, para 3-2; pages 3-8 thru 3-10, para 3-7 thru 3-9; page 3-22, para 3-18)

TEC Lesson 936-061-0108-F, RTP: Part 1, Initiating and Responding to Radio Call

TEC Lesson 936-061-0109-F, RTP: Part 2, Writing Down Messages Received by Radio

TEC Lesson 936-061-0110-F, RTP: Part 3, Responding to Messages

TEC Lesson 936-061-0111-F, RTP: Part 4, Preparing Messages to be Sent

TEC Lesson 036-061-0112-F, RTP: Part 5, Sending and Receiving Messages



**TASK NUMBER: 113-587-2002**

---

**PREPARE RADIO SET AN/VRC-64 FOR OPERATION**

---

**CONDITIONS:**

Given the functional components for the AN/VRC-64 radio, a tactical vehicle with mount MT-1029/VRC and antenna matching unit base installed in operational condition, antenna AS-1729/VRC or antenna AT-912/VRC, a frequency, callsigns, a radio station within range (can be another radio operator performing the task), a knowledge of how to make a radio check, TM 11-5820-498-12, and radio cables necessary to install the radio set. Entering a radio net is not required to perform this task.

**STANDARDS:**

1. Within 15 minutes, install and assemble the radio.
2. Within 10 minutes, place the radio into operation and make a communication check.

**PERFORMANCE MEASURES:**

**WARNING:** operator must be familiar with the requirements of TB SIG 291 before attempting installation or operation of the equipment covered in this task. Failure to follow requirements of TB SIG 291 could result in injury or DEATH.

1. **Installation of radio set AN/VRC-64** (figures 1 thru 4) (TM 11-5820-498-12, chap 2, pages 2-1 thru 2-7).
  - a. Inspect radio set to insure that all components are present:
    - (1) Amplifier-power supply OA-3633/GRC (figure 1).
    - (2) Mounting MT-1029/VRC (figure 2).
    - (3) Receiver-transmitter RT-871/PRC-77 (figure 3).

b. Observe the precaution on warning label, DA Label 132: **"WARNING: DO NOT START VEHICLE WHILE RADIO IS ON."** The label, positioned in attention-arresting location is required by SB11-624.

**WARNING: Do not permit manpack or vehicular whip antennas to touch high tension powerlines or other sources of electricity; injury or death could result. Observe the requirements of TB SIG 291 which illustrates the danger of permitting an antenna to contact other sources of power.**

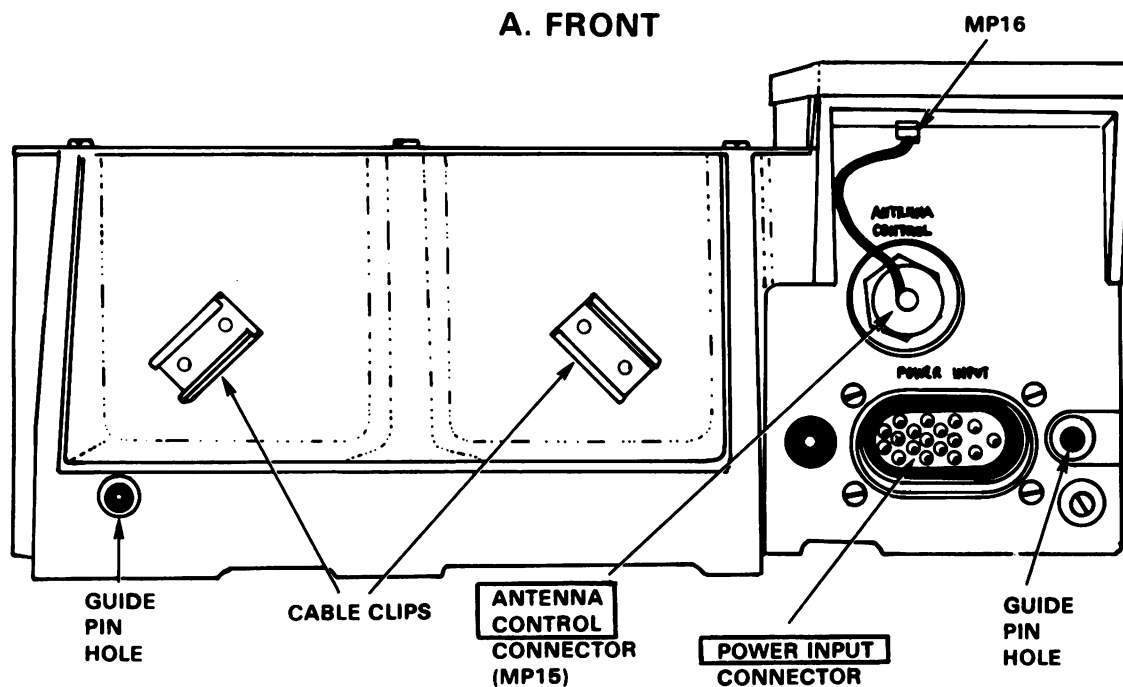
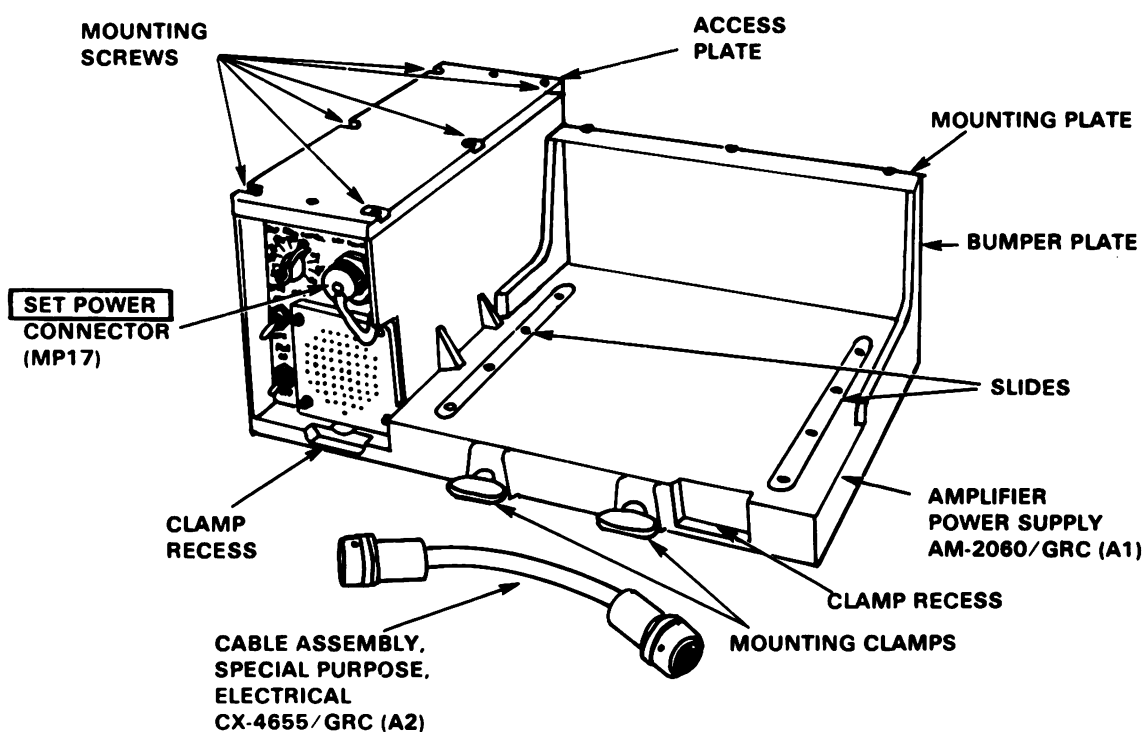
**CAUTIONS:**

- 1. Remove battery from battery box when the receiver-transmitter is installed in a vehicle.**
- 2. DO NOT OPERATE the radio within 3 megacycles of the operating frequency of another radio that is less than 25 feet away. Mutual interference can occur.**
- 3. DO NOT REVERSE the connections of the radio power cable leads at the vehicle battery. Damage to resistors and diodes may result if the leads are reversed at the battery terminals.**
- 4. DO NOT KEY the receiver-transmitter (by operating the handset push-to-talk switch or holding the audio accessory switch at RADIO position) while changing channels or the BAND switch. Module damage may occur or the frequency of the new channel may be incorrect.**
- 5. DO NOT START THE VEHICLE ENGINE, restart it, slave-start, or stop it with the radio turned on. The OA-3633/GRC PWR switch must be set to OFF and, if used, the AM-1780/VRC MAIN PWR switch must also be set to OFF.**

**2. Installation of Amplifier-Power Supply on Mounting MT-1029/VRC (figures 1 thru 3).**

- a. Loosen the clamps on the MT-1029/VRC.
- b. Set the amplifier-power supply (AM-2060/GRC) on the MT-1029/VRC.
- c. Mate the POWER INPUT connector at the rear of the amplifier-power supply with the connector on the MT-1029/VRC junction box. Be sure that the guide pins on the MT-1029/VRC are aligned with the guide pinholes on the amplifier-power supply.
- d. Push the amplifier-power supply back on the MT-1029/VRC.
- e. Engage the clamps on the MT-1029/VRC with the clamp recess on the amplifier-power supply. Tighten the clamps securely.





*Figure 1. Amplifier-power supply OA-3633/GRC.*



f. Connect the cable assembly (Special Purpose, Electrical CX-4722/VRC) between the amplifier-power supply ANTENNA CONTROL connector and connector J552 on Antenna Matching Unit MX-2799/VRC, or connector J2 on Antenna Matching Unit MX-6707/VRC (figure 4).

**NOTE:** The ANTENNA CONTROL connector on the back of the amplifier-power supply figure (figure 1) is female, and the one on the AT-912/VRC or AS-1729/VRC has male pins. Connect the corresponding mating end of the CX-4722/VRC accordingly.

**CAUTION:** Be careful when connecting the CS-4722/VRC connectors to the mating connectors. Improper mating damages the pins of the cable connector, or pins in the antenna matching units. First, line up the key in the receptacle with the slot in the cable connector; then press in on the cable connector and turn the cable connector sleeve to lock the cable connector to the receptacle.

**3. Installation of receiver-transmitter on amplifier-power supply (figures 1 and 3).**

**NOTE:** Only if immediate man-pack operation is expected during the mission, install the battery in the receiver-transmitter before installing the receiver-transmitter on the amplifier-power supply.

a. Loosen the screw-type-mounting clamps on the front of the amplifier-power supply; they will drop slightly.

b. Slide the receiver-transmitter into the amplifier-power supply until the bottom of the receiver-transmitter is flush with the bumper plate at the rear of the amplifier-power supply.

c. Raise the screw-type mounting clamps until they engage the lips on the panel of the receiver-transmitter; tighten the screw-type mounting clamps.

d. Remove the protective cap from the POWER connector on the panel of the receiver-transmitter.

e. Connect cable assembly (Special Purpose, Electrical CX-4655/GRC) between the amplifier-power supply SET POWER connector and the receiver-transmitter POWER connector (figure 3).

f. Connect cable assembly (Radio Frequency CG-1773/U) between the receiver-transmitter ANT connector and connector J551 and the MX-2799/VRC or connector J1 on the MX-6707/VRC (figure 4).

**4. Operation of set (figure 3) (TM 11-5820-498-12, chap 3, page 31-2, para 3-14).** (The numbers within steps below relate to the numbers in figure 3.)

**WARNING:** Dangerous voltage exists at the antenna. Be careful not to touch the antenna while the radio set is transmitting.

a. Connect the handset or microphone to either of the two receiver-transmitter (1) AUDIO connectors.

- b. Turn the receiver-transmitter (2) FUNCTION switch to ON.
  - c. Turn the amplifier-power supply (3) PWR switch to ON.
  - d. Adjust the receiver-transmitter (4) VOLUME control until background noise is heard.
  - e. If squelch operation (2) is to be used, refer to TM 11-5820-498-12, paragraph 3-12a, b, and c, for squelch operation conditions and perform the procedures given in 12d to use the squelch feature.
  - f. If the amplifier-power supply loudspeaker is to be used, proceed as follows:
    - (1) Set the (6) SPKR switch ON.
    - (2) Adjust the receiver-transmitter VOLUME control to a desired listening level.
  - g. Tune the receiver-transmitter as follows:
    - (1) Turn the (7A) BAND switch to 30-52 or 53-75, depending on the frequency band desired.
    - (2) Turn the MHz tuning and KHz tuning controls (7B) until the operating frequency appears on the channel dial.
  - h. Turn the OA-3633/GRC ANT (8) FREQ CONTROL to the position that includes the selected operating frequency.
- CAUTION: If the H-138(\*)/U is used (i below), do not speak into both microphone elements. The H-138(\*)/U has two microphone elements for noise cancellation; speaking into both elements at the same time will cancel out your voice.**
- i. To transmit, press the handset push-to-talk switch and speak into one microphone element; to receive, release the switch.
  - j. To turn the radio set off:
    - (1) Set the OA-3633/GRC PWR switch to OFF.
    - (2) Turn the receiver-transmitter FUNCTION switch to OFF.

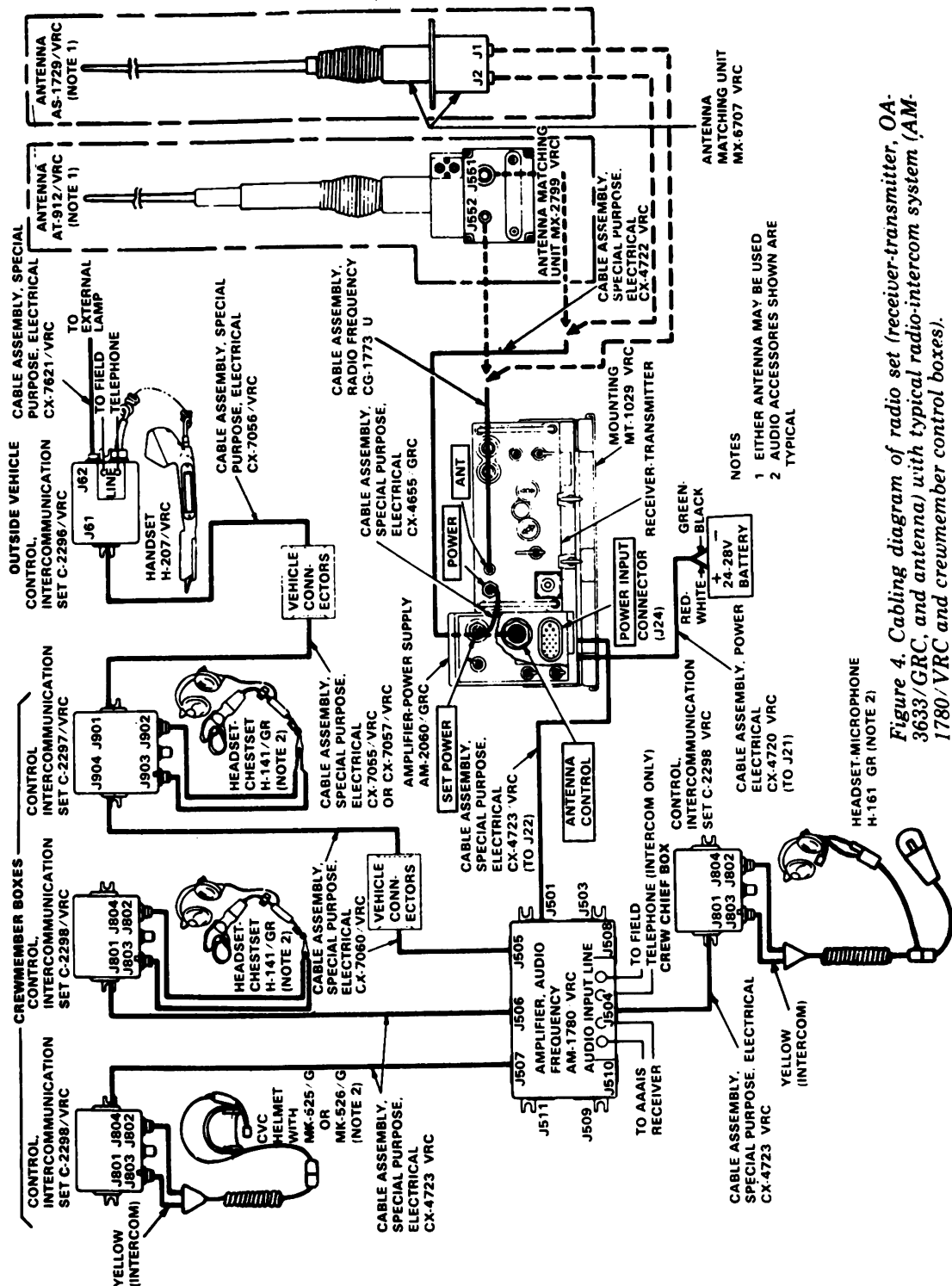


Figure 4. Cabling diagram of radio set (receiver-transmitter, OA-3633/GRC, and antenna) with typical radio-intercom system (AM-1780/VRC and crewmember control boxes).

## REFERENCE:

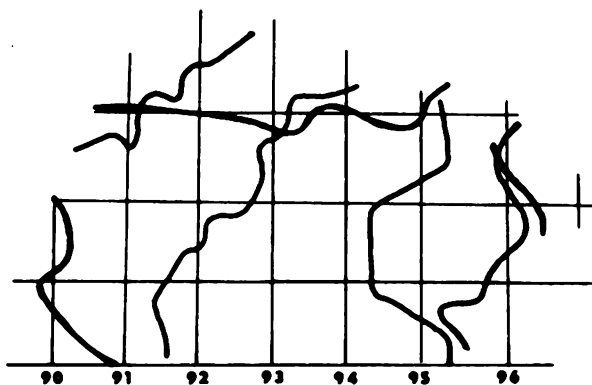
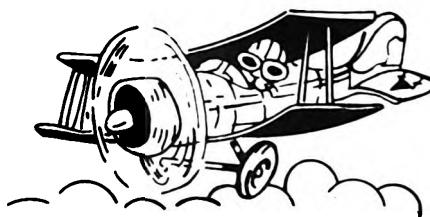
TM 11-5820-498-12, Operator's and Organizational Maintenance Manual, Including Repair Parts and Special Tool Lists: AN/VRC-64, May 67, C1-5 (chap 2, pages 2-1 thru 2-7; chap 3, page 3-12, para 3-14)





The first thing you should know about a map is that it's nothing more than a drawing of a piece of the earth's surface. It's a drawing made of the earth as you would see it from an airplane

—looking straight down.



Prepared by the Army Map Service (LUI), Corps of Engineers, U.S. Army, Washington, D.C. Com-  
piled in 1966 from Alabama, 1:25,000 AMS, Sheets 3847 III NE, NW, SE, SW, field checked 1965.  
Horizontal and vertical control by USC&GS, AMS and CE. This map complies with the national stan-  
dard map accuracy requirements. Map not field checked.

#### LEGEND

Tint indicates areas in which only landmark buildings are shown  
ROAD DATA 1965  
In developed areas, only through roads are classified

Hard surface, heavy duty road, four or more lanes wide		Improved light duty road, street	
Hard surface, heavy duty road: Two lanes wide; Three lanes wide		Unimproved dirt road	
Hard surface, medium duty road, four or more lanes wide		Trail	
Hard surface, medium duty road: Two lanes wide; Three lanes wide		Route markers: Interstate, Federal, State	
Buildings		Barns, sheds, greenhouses, stadiums, etc.	
RAILROADS		Bench mark, non-monumented	
Standard gauge		Spot elevations in feet: Checked; Unchecked	
Narrow gauge		Light, lighthouse; Windmill; wind pump; Water mill	
In street		Woods or brushwood	
Carline		Vineyard; Orchard	
BOUNDARIES		Intermittent lake	
National		Intermittent stream; Dam	
State (with monument)		Marsh or swamp	
County		Rapids; Falls	
County subdivision		Large rapids; Large falls	
Corporate limits			
Military reservation			
Other reservation			

In order to make the map more useful to soldiers, the map shows much more than just terrain. It shows man-made objects as well as things like roads, buildings, and bridges, just to name a few. All of these man-made objects are represented by a symbol, and the symbols are explained in the lower left corner of every map in a section called the legend.

Besides giving symbols for man-made objects, the legend also gives the color code used on the map, and explains the meanings of other symbols which give you an even better idea of what the ground actually looks like. Look at the legend before you begin using the map.



## TASK NUMBER: 071-329-1001

---

**IDENTIFY TERRAIN FEATURES (NATURAL AND  
MANMADE) ON THE MAP**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map which includes examples of one or more of each of the natural features identified in 1 through 5 below, and which has examples of the use of colors to identify classes of features as in 6 through 10 below:

- |               |          |
|---------------|----------|
| 1. Hilltop    | 6. Black |
| 2. Ridge      | 7. Blue  |
| 3. Valley     | 8. Green |
| 4. Saddle     | 9. Brown |
| 5. Depression | 10. Red  |

**STANDARDS:**

Within 3 minutes, identify one of each type terrain feature marked on the map given to you by your supervisor.

**PERFORMANCE MEASURES:**

Your military map shows something important that ordinary maps don't have. That is elevation (relief)—the slopes, hills, and valleys. You will learn later in this book about locating points, measuring distances, and finding the right direction. But you should also check hills and valleys along the direction you intend to travel before you start. **IT MIGHT SAVE YOU SOME TROUBLE.**

1. To identify terrain features, refer to figure 1.
2. Colors used to identify a class of features.
  - a. Black - The majority of cultural or manmade features.
  - b. Blue - Water features such as lakes, rivers, and swamps.
  - c. Green - Vegetation such as woods, orchards, and vineyards.
  - d. Brown - All relief features such as contour lines.
  - e. Red - Used to classify manmade features as to their type or use, e.g., main roads, built-up areas, and special features.

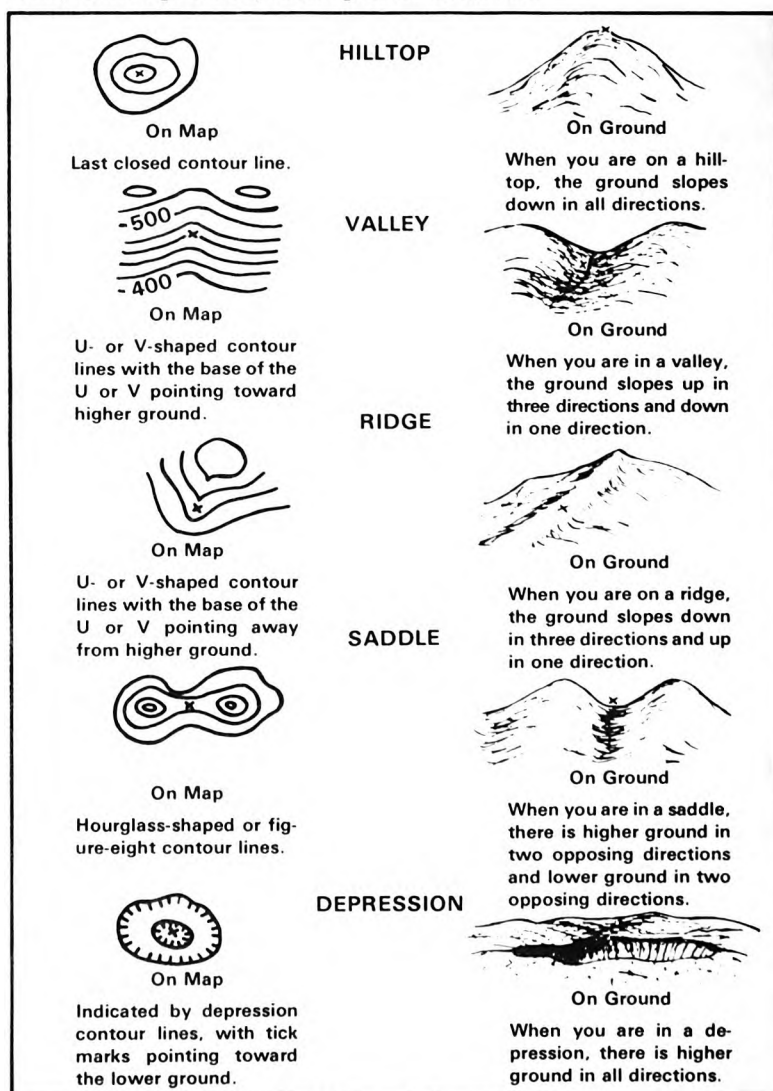
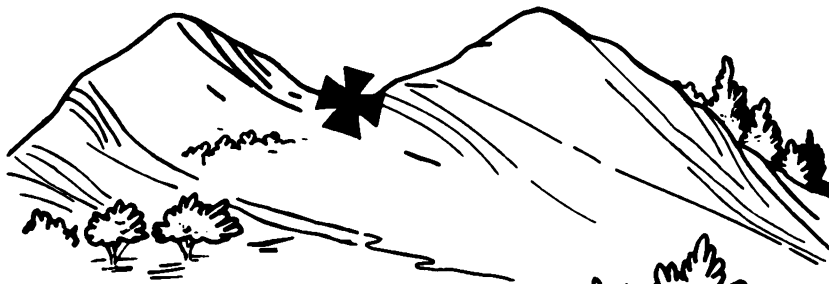
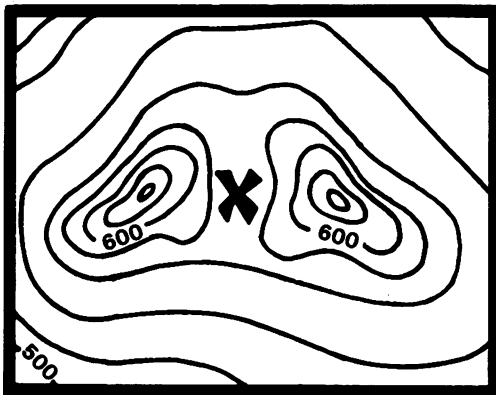


Figure 1.

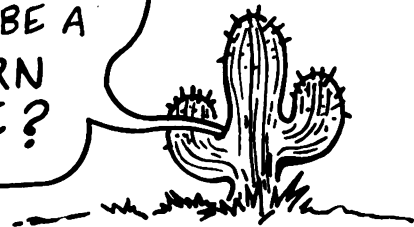
**NOTE:** Occasionally, other colors may be used to show special information. These will be indicated in the marginal information on the map.



Sometimes contour lines show two hill-tops fairly close together. The lower terrain between the two hilltops is called a SADDLE. Going through a saddle is sometimes the easiest route to use to get beyond the two hills. Of course, you wouldn't go through a saddle if the enemy was on the hills.



IF IT WAS IN CALIFORNIA —  
WOULD IT BE A  
WESTERN  
SADDLE?

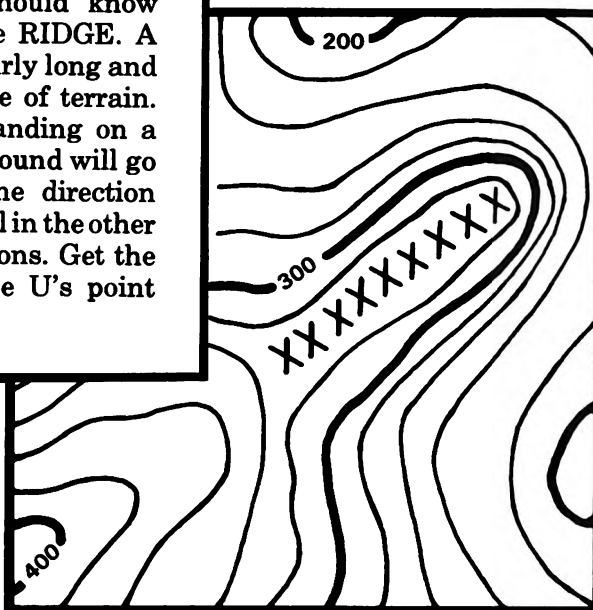


Contour lines across a stream always come together in a "V". The point of the "V" points upstream.

Your legend tells you that water is shown in blue on your map. You already know that streams just don't run along the tops of hills! So looking for streams is a good way to find valleys.



Another terrain feature that you should know about is the RIDGE. A ridge is a fairly long and narrow piece of terrain. If you're standing on a ridge, the ground will go uphill in one direction and downhill in the other three directions. Get the picture? (The U's point downhill.)



#### REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 6, page 6-1 thru 6-9, para 6-1, 6-2)

TC 21-26, Don't Get Lost, Feb 73 (pages 46 thru 49)

TEC Lesson 930-071-0013-F, Introduction to Land Navigation

TEC Lesson 930-071-0016-F, Terrain Features

## TASK NUMBER: 071-329-1002

---

**DETERMINE THE GRID COORDINATES OF A POINT  
ON A MILITARY MAP USING THE MILITARY GRID  
REFERENCE SYSTEM**

---

**CONDITIONS:**

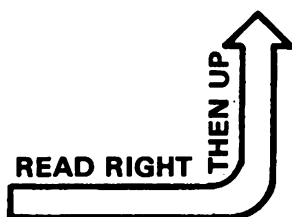
Given a standard, 1:50,000 scale military map, a 1:50,000 grid coordinate scale, a pencil and paper, and a point on the map which is labeled for identification (for example, Point A).

**STANDARDS:**

Within 2 minutes, determine the six-digit grid coordinates for a point to within 100 meters (grid coordinates must be preceded by the correct two-letter 100,000-meter-square identifier).

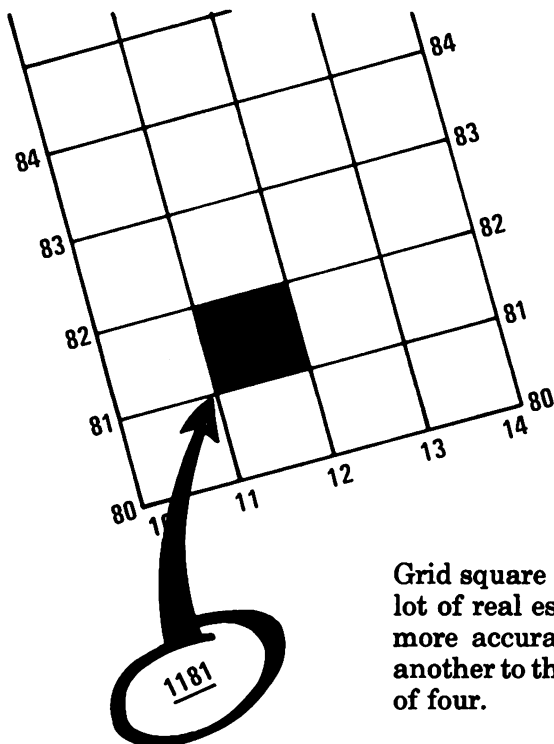
**PERFORMANCE MEASURES:**

To keep from getting lost in the boonies you have to know how to find your location or your address. There are no street addresses in a combat area, but the military map can spot your location accurately. It has black lines running up and down (north and south) and crosswise (east and west). They form small squares called grids. These lines are numbered along the outside edge of the map picture. Using these numbers you can name each square.

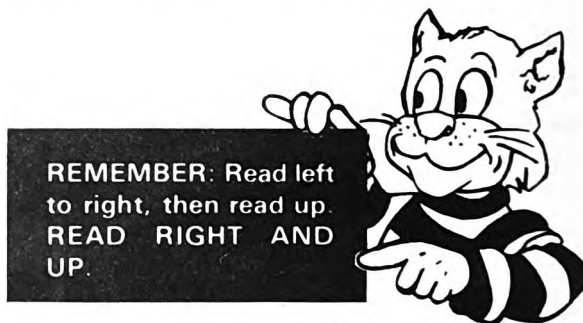


**NO TWO SQUARES HAVE  
THE SAME NUMBER! TO GET  
THE CORRECT NUMBER FOR A  
CERTAIN GRID SQUARE, FIRST  
READ FROM LEFT TO RIGHT ALONG  
THE BOTTOM AND FIND THE LINE  
THAT BORDERS YOUR GRID  
SQUARE ON THE LEFT. THEN  
READ UP AND FIND THE EAST-  
WEST LINE THAT BORDERS  
YOUR GRID SQUARE  
ALONG THE  
BOTTOM.**





Look at the picture. Your address is grid square 1181. How do you know this? Start from the left and read **RIGHT** until you come to 11, the first half of your address. Then read **UP** to 81, the last half. Your address is somewhere in grid square 1181.

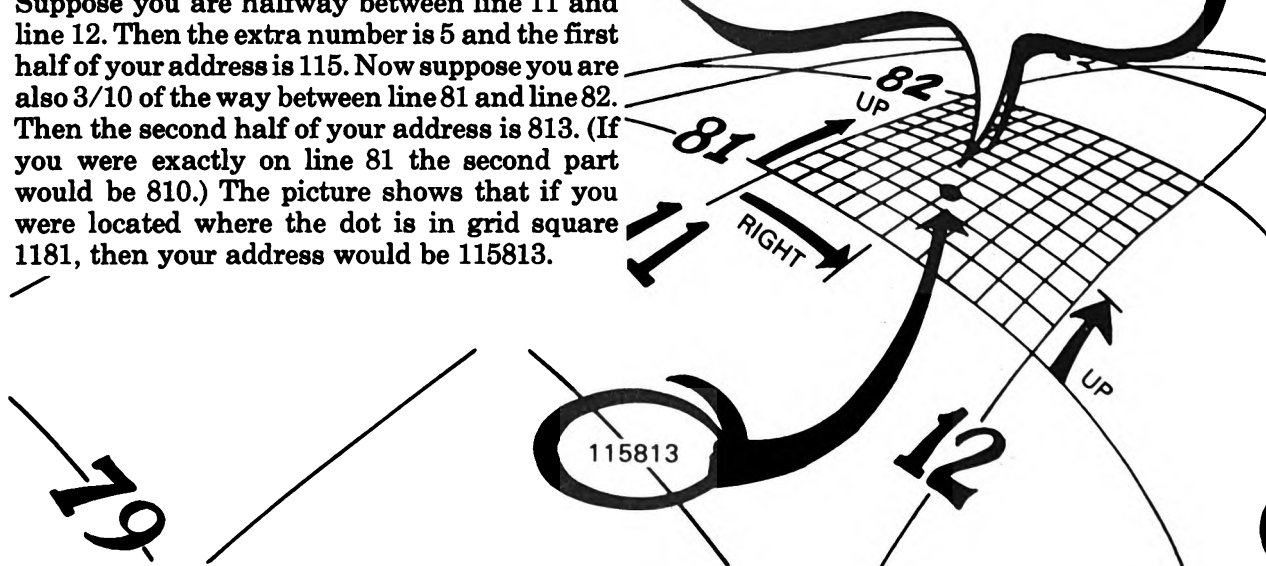


Grid square 1181 gives your general neighborhood, but there is a lot of real estate inside that grid square. To make your address more accurate just add another number to the first half and another to the last half—so your address has six numbers instead of four.

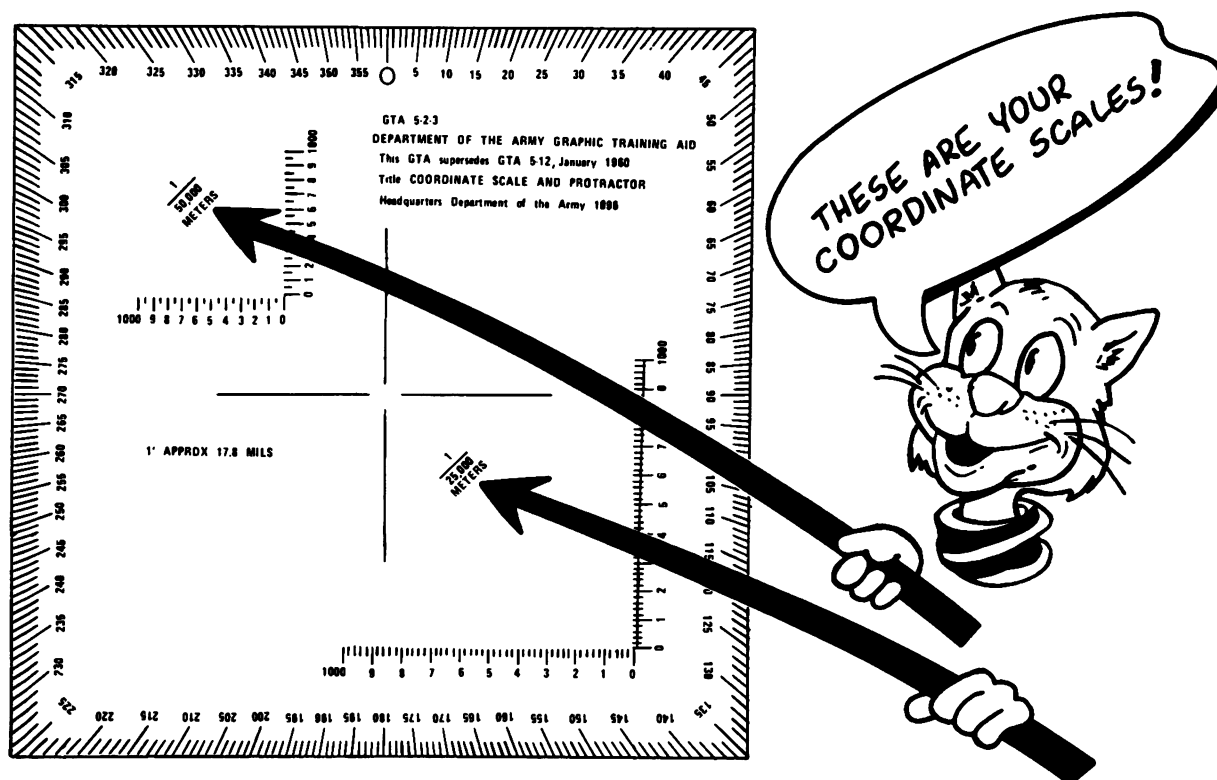
Here's how to get those extra numbers. Pretend that each grid square has ten lines inside it running north and south, and another 10 running east and west. This makes 100 smaller squares. You can estimate where these imaginary lines are.

Suppose you are halfway between line 11 and line 12. Then the extra number is 5 and the first half of your address is 115. Now suppose you are also 3/10 of the way between line 81 and line 82. Then the second half of your address is 813. (If you were exactly on line 81 the second part would be 810.) The picture shows that if you were located where the dot is in grid square 1181, then your address would be 115813.

THESE SIX NUMBERS ARE CALLED YOUR **COORDINATES**. THEY GIVE YOUR LOCATION, AND IF YOU ALWAYS KNOW WHAT THEY ARE, YOU CAN NEVER BE LOST!



If you have this little device, you don't have to worry about estimating exactly where you are inside a certain grid square. You don't have to use imaginary lines, because you can come up with your **exact** coordinates.



This is a **coordinate scale and protractor**. It helps you measure small distances inside grid squares. You can also measure angles with it. The coordinate scale and protractor is nothing more than a square piece of clear thin plastic. It is usually called just a "protractor" for short. Here's how to determine the six-digit grid coordinates of a point on a map using a protractor.

1. First locate the grid square in which the Point is located (the Point should already be plotted on the map). (See figure 1.)
2. The number of the vertical grid line on the left (west) side of the grid square is the **first** and **second** digits of the coordinate.
3. The number of the horizontal grid line on the bottom (south) side of the grid square is the **fourth** and **fifth** digits of the coordinate.
4. To determine the **third** and **sixth** digits of the coordinate, place the grid coordinate scale on the bottom grid line of the grid square in which Point A is located.

5. Check to see that the zeros of the coordinate scale are in the lower lefthand (southwest) corner of the grid square.

6. Slide the coordinate scale to the right keeping the bottom of the scale on the bottom grid line until Point A is located under the vertical (righthand) scale. (See figure 2.)

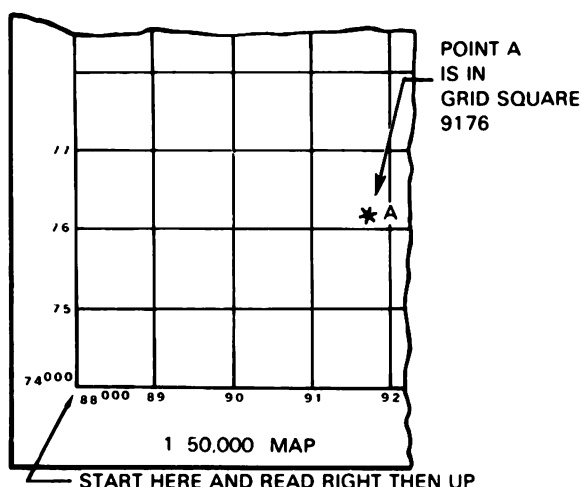


Figure 1.

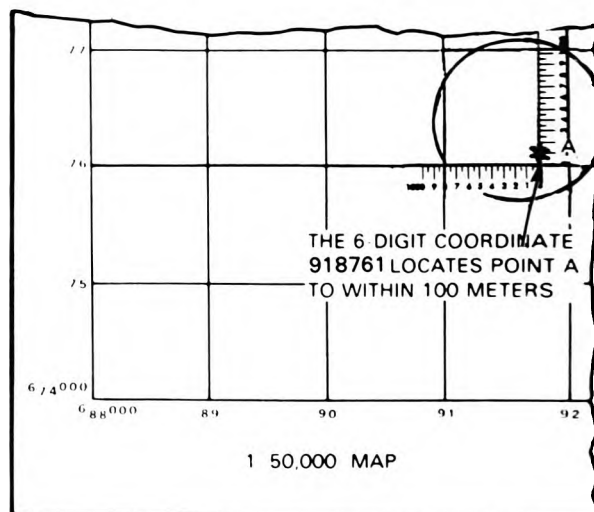


Figure 2.

7. The 100-meter mark on the bottom (horizontal) coordinate scale which is nearest the north-south gridline represented by the first and second digit of the coordinate to be determined is the third digit.

8. The 100-meter mark on the righthand (vertical) coordinate scale which is nearest Point A is the sixth digit.

9. Write the 6-digit coordinate on the paper provided.

10. Determine the correct two-letter 100,000-meter-square identifier by looking at the grid reference box in the margin of the map.

11. Place the 100,000-meter-square identifier in front of the 6-digit coordinate.

**NOTE:** As an alternate training method to improve map reading ability, start with a six-digit coordinate and plot the point on the map.

## REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 3, pages 3-8 thru 3-20, para 3-4 thru 3-7)

TC 21-26, Don't Get Lost, Feb 73 (pages 5-9)

TEC Lesson 930-071-0013-F, Introduction to Land Navigation



**TASK NUMBER: 071-329-1010**

---

**DETERMINE AZIMUTHS USING A COORDINATE  
SCALE AND PROTRACTOR**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map, two known points plotted on the map, coordinate scale and protractor, a straightedge object, a pencil, and a requirement to determine the azimuth from your location (Point A) to another point (B) on the map.

**STANDARDS:**

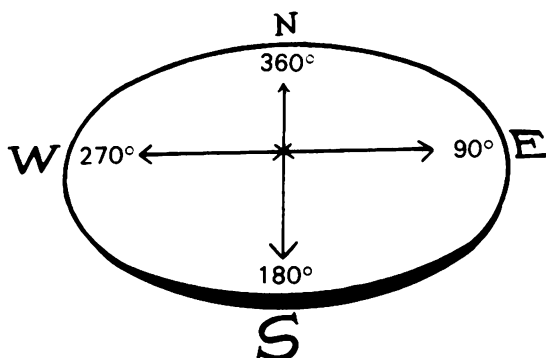
1. Determine the grid azimuth from your location (Point A) to Point B to within 1 degree in 3 minutes.
2. Determine the back azimuth of a given azimuth to the exact degree.

**PERFORMANCE MEASURES:**

1. The direction from one point to another point, either on the map or on the ground, has a military name --

# **AZIMUTH**

2. Azimuths are given in degrees in a clockwise direction. Since there are 360 degrees in a circle, your azimuth can be any number up to 360. Due east is 90 degrees, due south is 180 degrees, due west is 270 degrees, and due north is 360 degrees.



2-II-E-4.1

3. To get the right azimuth from a map you have to use a protractor. **Here is how to use your protractor to determine an azimuth:**

- a. Determine your location (Point A) and the location of the other point (B) on the map (see figure 1).
- b. Draw a straight line from Point A to Point B.
- c. Place the index of the protractor over center of mass of Point A with the  $0^\circ$  on the protractor at the top and  $90^\circ$  to the right.
- d. Start at the  $0^\circ$  point on the protractor and read to the right in a clockwise manner until reaching the point where the straight line intersects the protractor scale.
- e. Read the azimuth in degrees from the protractor -  $210^\circ$ .

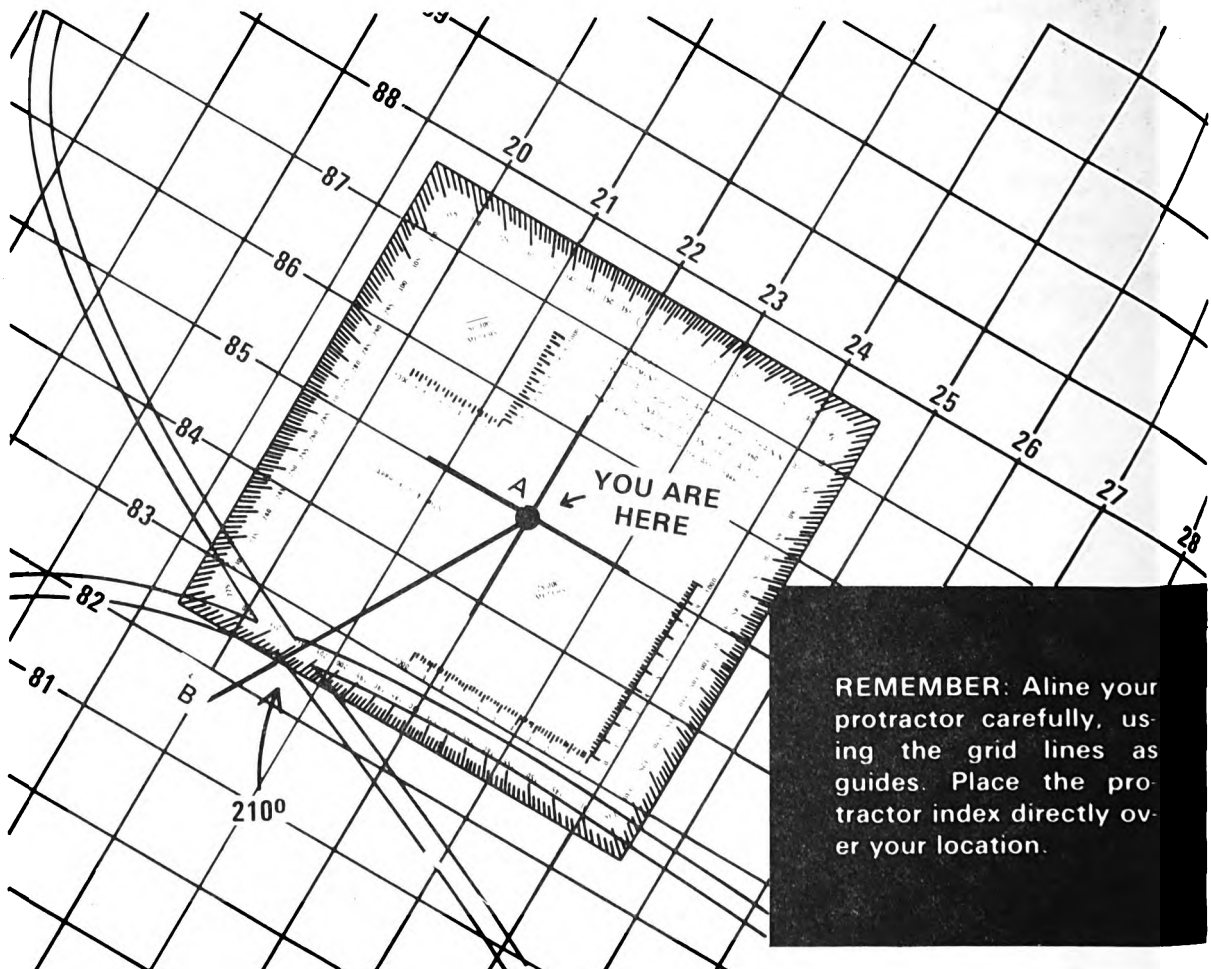


Figure 1.

WHEN YOU TURN AROUND COMPLETELY, YOU  
TURN BACK 180 DEGREES!



$$\begin{array}{r} 320 \\ -180 \\ \hline 140 \end{array} \quad \begin{array}{r} 60 \\ +180 \\ \hline 240 \end{array}$$

If you can't subtract 180 degrees because your first azimuth is too small, then just add 180 degrees. For example, if your azimuth was 40 degrees, you know that you can't subtract 180 degrees, so you add 180. The back azimuth would be  $40 + 180 = 220$  degrees.

$$\begin{array}{r} 210 \\ -180 \\ \hline 30 \end{array} \quad \begin{array}{r} 16 \\ +180 \\ \hline 196 \end{array} \quad \begin{array}{r} 40 \\ +180 \\ \hline 220 \end{array} \quad \begin{array}{r} 190 \\ -180 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 72 \\ +180 \\ \hline 252 \end{array}$$

Suppose you follow the 210-degree azimuth in figure 1 to the road junction, and then want to go back to your original location. To do this, you take a **BACK AZIMUTH**. You simply subtract 180 from the first azimuth. Your back azimuth is  $210 - 180 = 30$  degrees.

**REMEMBER** A back azimuth goes in the opposite direction from an azimuth.

Can you figure out the back azimuth of 290 degrees?

How about the back azimuth of 75 degrees?

Check your answers with the correct answers listed to the right.

**ANSWERS:** The back azimuth of 290 degrees is 290 minus 180, which is 110 degrees. The back azimuth of 75 degrees is 75 plus 180, which is 255 degrees.

## REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 3, page 3-11, para 3-4c2; chap 5, page 5-13, para 5-8)

TC 21-26, Don't Get Lost, Feb 73

TEC Lesson 930-071-0014-F, Measuring Distance and Azimuth



## TASK NUMBER: 071-329-1009

---

**CONVERT AZIMUTHS (MAGNETIC OR GRID)**

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**CONDITIONS:**

Given a standard 1:50,000 scale military map with a declination diagram, a pencil, and either a magnetic azimuth or a grid azimuth which must be converted.

**STANDARDS:**

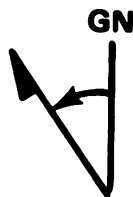
Within 3 minutes, convert the given magnetic azimuth to a grid azimuth (or grid to magnetic) without error.

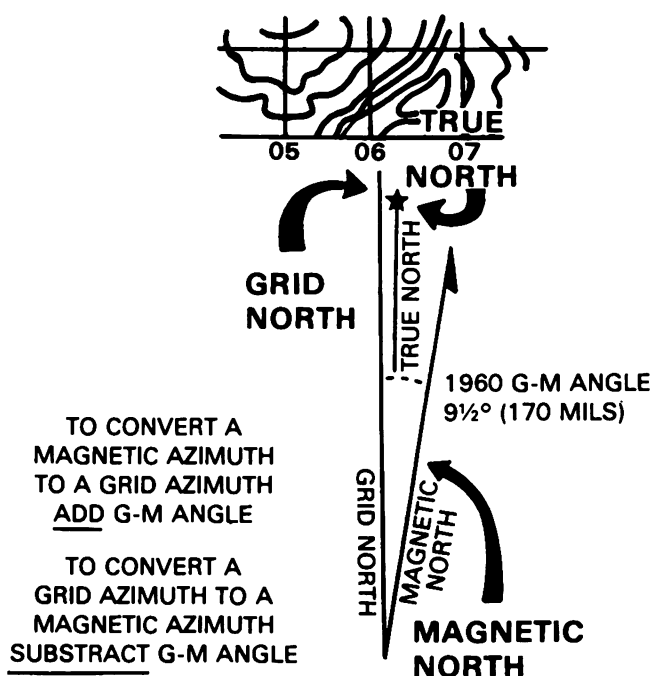
**PERFORMANCE MEASURES:****1. Easterly Grid-Magnetic (G-M) Angle (figure 1):**

- a. To convert a magnetic azimuth to a grid azimuth, add the value of the G-M angle to the magnetic azimuth.
- b. To convert a grid azimuth to a magnetic azimuth, subtract the G-M angle from the grid azimuth.

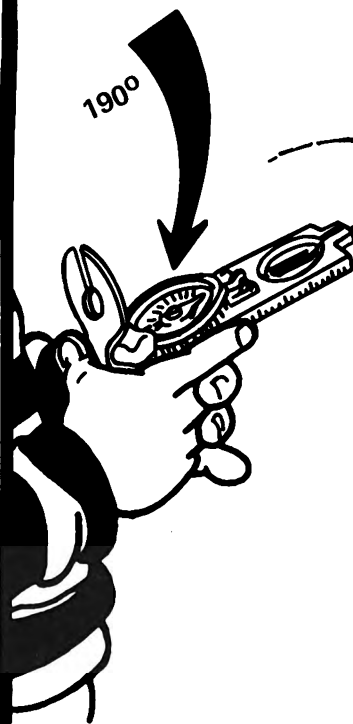
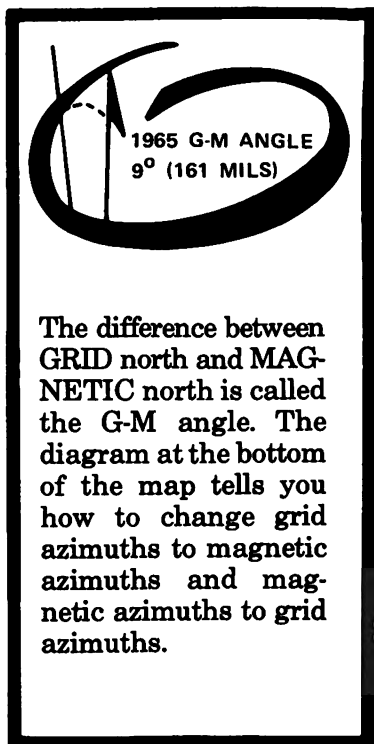
**2. Westerly Grid-Magnetic (G-M) Angle (figure 2):**

- a. To convert a magnetic azimuth to a grid azimuth, subtract the value of the G-M angle from the magnetic azimuth.
- b. To convert a grid azimuth to a magnetic azimuth, add the value of the G-M angle to the grid azimuth.

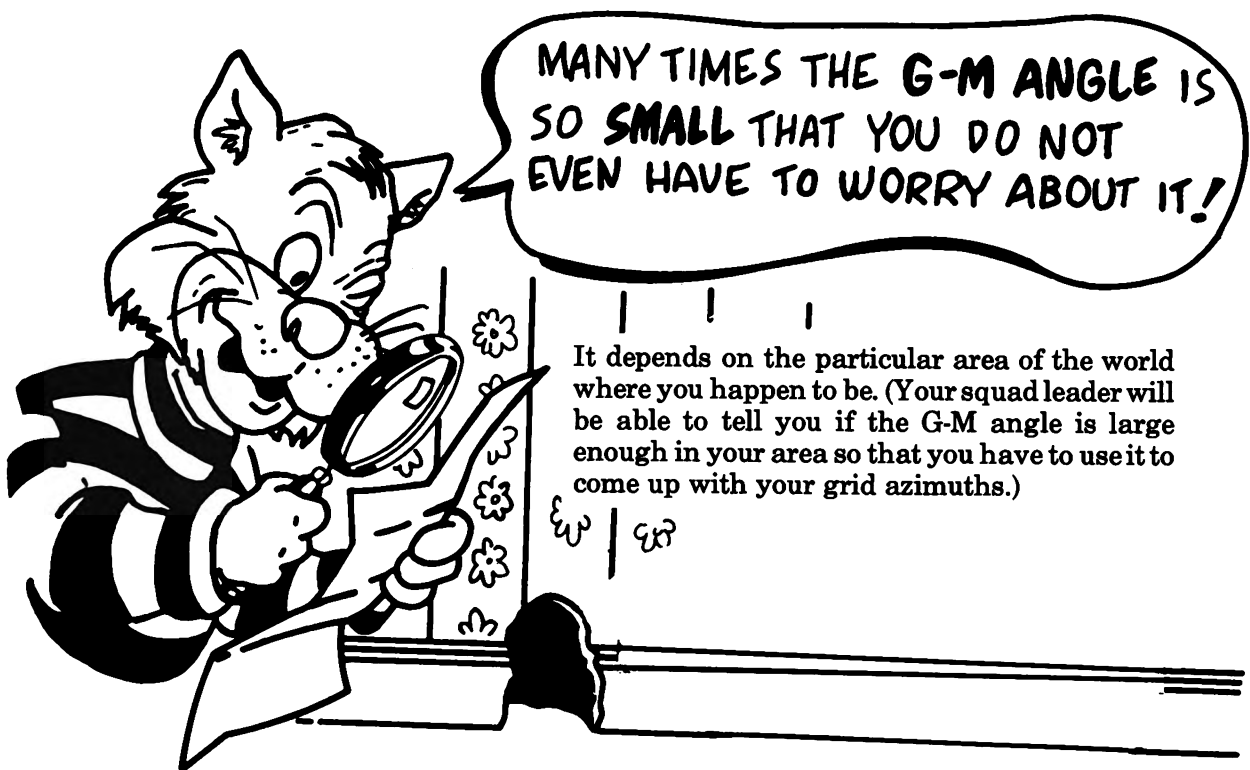
*Figure 1.**Figure 2.*



The north-south lines on your map give GRID north. The needle of the compass points to MAGNETIC north. Grid north and magnetic north are usually different by a few degrees. Neither one points straight at the north pole that's called TRUE north, but you needn't worry about TRUE north to keep from getting lost in a combat area. The difference in degrees for every map is shown at the bottom of the map sheet.



For example, you aim your compass at a distant tower. The compass reading you get is 190 degrees—the MAGNETIC azimuth. The diagram on your map tells you that the G-M angle is 9 degrees, and it also tells you that “to convert a magnetic azimuth to a grid azimuth, add the G-M angle.” So, add 9 degrees to your compass reading. This gives you  $190 + 9 = 199$ . Your grid azimuth is 199 degrees.

**REFERENCES:**

FM 21-26, Map Reading, C1, Jan 69 (chap 5, pages 5-1 thru 5-6, para 5-3 thru 5-4)

TC 21-26, Don't Get Lost, Feb 73 (pages 21-26)

TEC Lesson 930-071-0015-F, Converting Azimuths



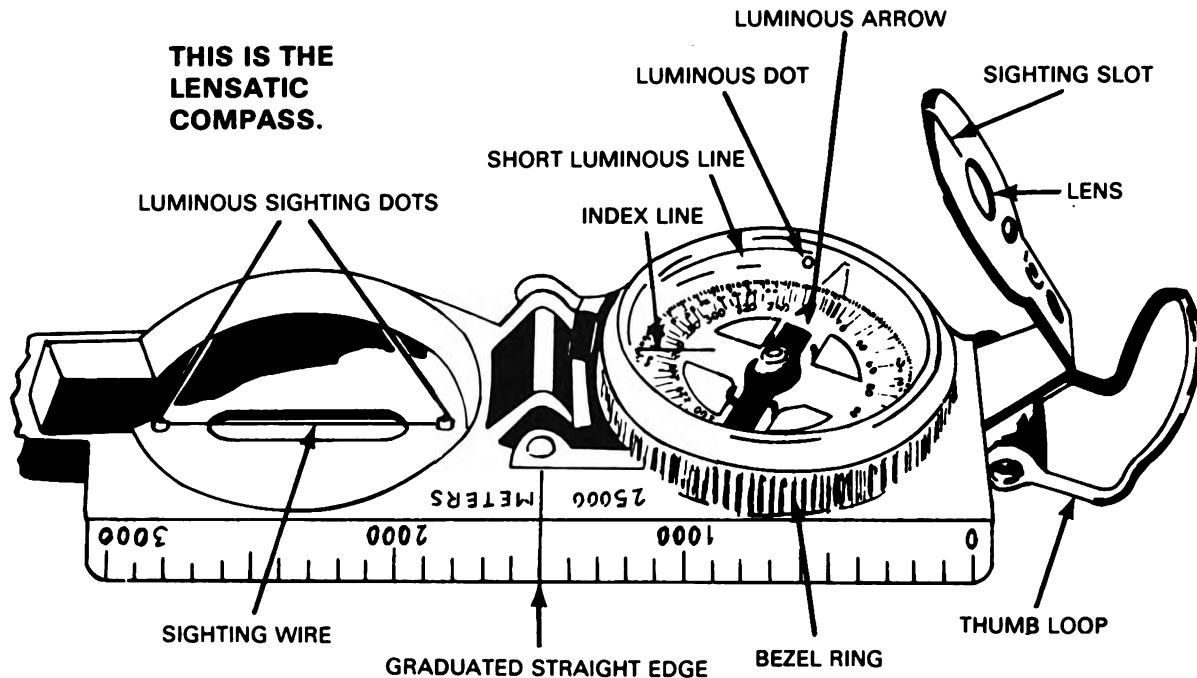


**TASK NUMBER: 071-329-1003****DETERMINE A MAGNETIC AZIMUTH USING A COMPASS****CONDITIONS:**

Given a compass (which has been checked against an aiming circle and has no noticeable deviation), a designated point on the ground, in a field environment, under daylight conditions.

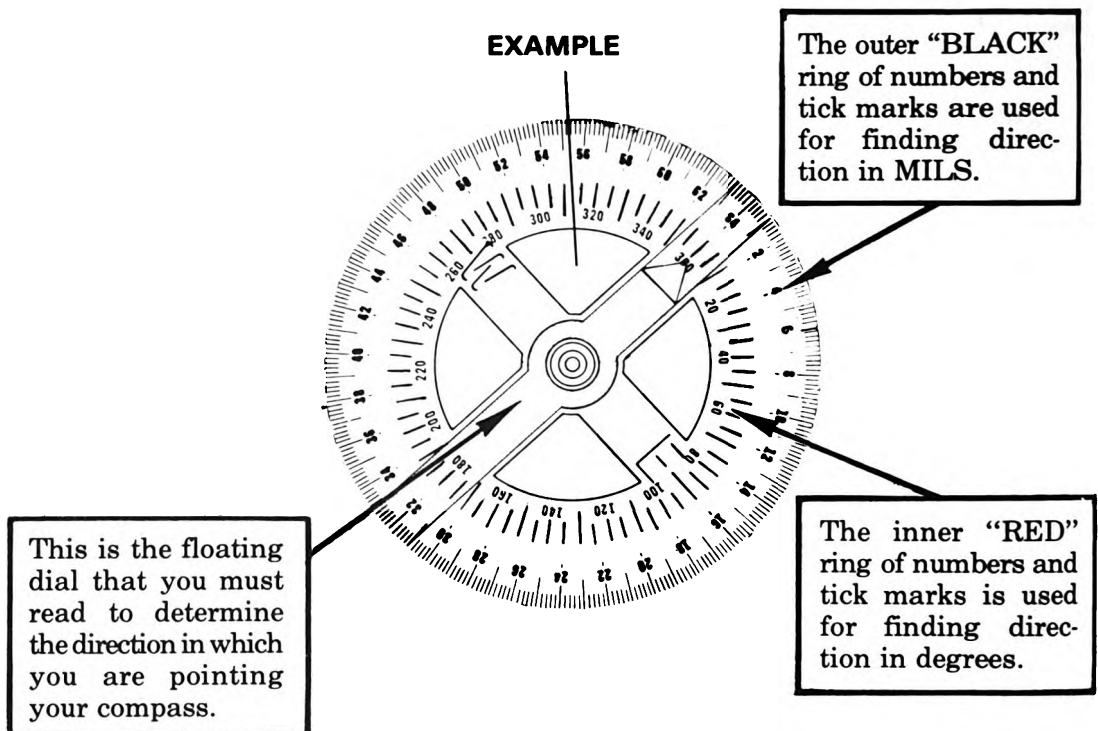
**STANDARDS:**

Within 1 minute, determine the correct magnetic azimuth to the designated known point, to within 3 degrees, using the center-hold technique.

**PERFORMANCE MEASURES:****KNOW YOUR COMPASS**

**BEWARE:** Your compass is a sensitive instrument and it's your best friend in the boonies. Take care of it and it will take care of you!

## HOW TO READ YOUR COMPASS



- (1) There are 360 degrees or 6400 mils (m) in a complete circle and these are marked for you with a tick mark every 5 or 20 m. However, you will notice that not every tick mark is numbered. So you will have to determine the number for these lines using the numbers that are shown.
- (2) To read direction, point the compass in the direction you want to go or the direction you want to determine.
- (3) Look beneath the black hairline on the outer glass cover and estimate to the nearest degree or 10 mils the position of the hairline over the (red/black) scale.
- (4) Be careful to hold the compass still so that the dial remains stationary while you are reading the scale.
- (5) In the example above, the readings are:
  - a. Degrees (Red Scale) - 312°
  - b. Mils (Black Scale) - 5530 mils
- (6) If you understand the readings in the example and can apply the center-hold technique of shooting an azimuth, you'll be proficient in performing this task.

## How Do You SHOOT An Azimuth?

- ① You use your compass to find or follow an azimuth. The arrow on the compass points towards magnetic north. The arrow is also attracted by any mass of metal - a jeep, truck, your rifle, your helmet, and even electrical power lines. So be sure you use your compass away from metal objects - so it won't give you a bum steer.

- ② You should use the center-hold technique! It's faster, easier, and more accurate than the old sighting method.

- ③ Open the compass so that the cover forms a straight edge with the base. The lens of the compass is moved out of the way.

- ④ Next, place your thumb through the thumb loop, form a steady base with your third and fourth fingers and extend your index finger along the side of the compass.

- ⑤ Place the thumb of the other hand between the eyepiece and the lens; extend the index finger along the remaining side of the compass and the remaining fingers around the fingers of the other hand; pull your elbows firmly into your sides. This will place the compass between your chin and your belt.

- ⑥ To measure an azimuth, simply turn your entire body toward the object, pointing the compass cover directly at the object. Once you are pointing at the object, just look down and read the azimuth from beneath the fixed black index line. Man, you can even use this method at night!

- ⑦ If you are land navigating, stop occasionally to check the azimuth along which you are moving to keep from going in circles. Also, you can move from object to object along your path of travel by shooting an azimuth to each object and then moving to that object. Repeating this process while you navigate should keep you "straight!"

**REMEMBER:  
THE ABOVE  
METHOD IS  
TRIED AND  
TRUE!**



WELL, NOW YOU KNOW QUITE A BIT ABOUT **HOW** TO USE YOUR **COMPASS** TO KEEP FROM **GETTING LOST**. BUT DO YOU KNOW WHAT REALLY **SEPARATES THE MEN FROM THE BOYS**? IT'S KNOWING HOW TO USE THAT **TRUSTY OLD COMPASS AT NIGHT!**

Take another look at the compass on the preceding page. Those luminous lines and luminous dots have a special purpose. See that bezel ring? When you rotate it, you should be able to hear it click. Well, those clicks also have a special purpose, just like the luminous lines and dots. They're all built into the compass to help you set an azimuth on your compass and follow it at night.

WANT TO LEARN HOW TO GET YOUR COMPASS TO KEEP YOU **"ON COURSE"** AT NIGHT? IT TAKES A LITTLE KNOW-HOW — BUT IF YOU UNDERSTAND **EVERYTHING** ABOUT THE COMPASS SO FAR, YOU'LL HAVE NO TROUBLE PICKING IT UP!

WHERE DO YOU FIND THE INFO? LOOK FOR THE CAT WITH THE **STRIPES** — YOUR **SQUAD LEADER!** HE'LL FILL YOU IN WITH ALL YOU NEED TO KNOW. OR YOU CAN CHECK **FM 21-26!**

#### REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 5, pages 5-8 thru 5-10, para 5-6)

TC 21-26, Don't Get Lost, Feb 73 (pages 24-29)

TEC Lesson 930-071-0017-F, The Lensatic Compass

## TASK NUMBER: 071-329-1018

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**DETERMINE DIRECTION USING  
FIELD EXPEDIENT METHODS**

---

**CONDITIONS:**

Given: you are temporarily disoriented or have become detached from your unit and you are without a compass. Materials to assist you in performing this task will depend upon your geographic location. Use the field expedient method that is best suited to your location.

**STANDARDS:**

Perform any or all of the field expedient methods for determining directions without a compass by following the instructions given in the performance measures below.

**PERFORMANCE MEASURES:**

1.

**direction...  
without a  
compass**

a. When you have no compass, use the sun to find your direction. You probably remember the old rule that "the sun rises in the east and sets in the west." Well, that's a pretty good rule, but it's not quite right.

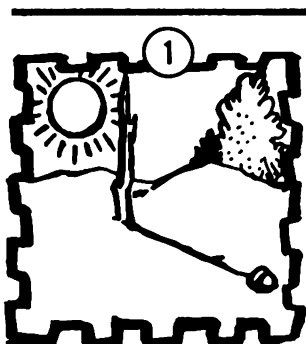


**ACTUALLY, IN THE MORNING  
THE SUN RISES ALMOST  
EAST, AND IN THE AFTERNOON  
THE SUN SETS ALMOST WEST!**

b. You see, very seldom does the sun lie DUE east (exactly 90 degrees), or DUE west (exactly 270 degrees) on the horizon. Where exactly the sun does rise and set depends on where you happen to be on the earth's surface, and also on what time of year it is.

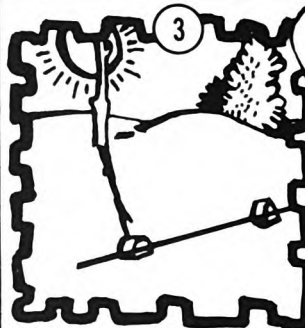
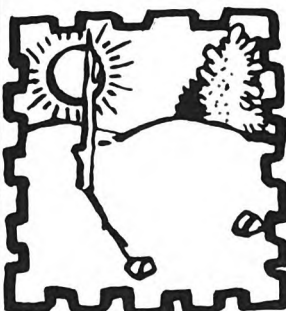
c. So now you're probably asking yourself, "How can I use the sun to find my direction if I don't know exactly where it is?"

**EASY!** Just use the SHADOW-TIP field expedient method. It's quick, it's easy, and it's very accurate. Here's how to do it in three simple steps:



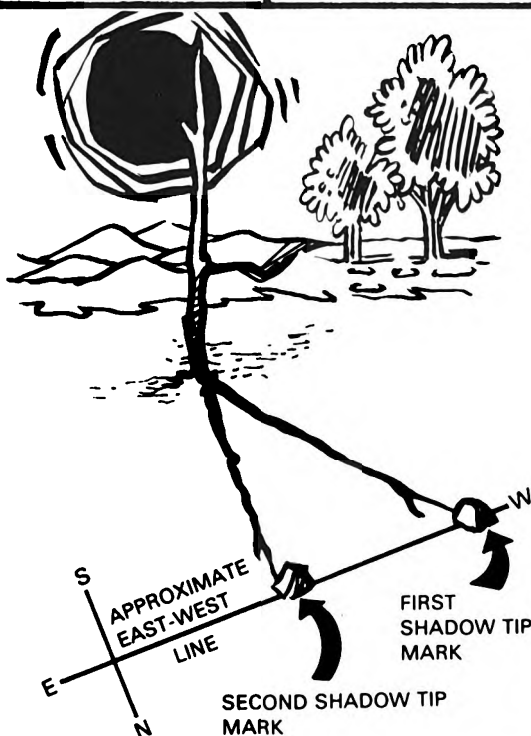
Place a stick or branch into the ground vertically at a fairly level spot where a distinct shadow will be cast. mark the shadow tip with a stone, twig, or other means.

② Wait about 10 or 15 minutes until the shadow tip moves a few inches. Mark the new position of the shadow tip just like the first.



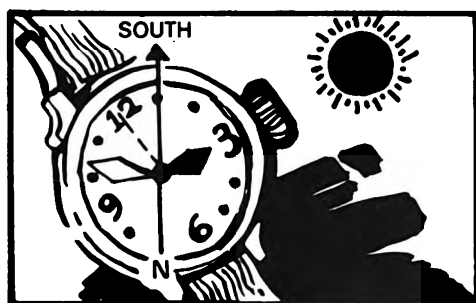
Draw a straight line through the two marks which you made on the shadow tips. This line you have drawn is an EAST-WEST line.

**BUT WHICH SIDE IS EAST AND WHICH IS WEST?**



Well, since the sun rises in the east and sets in the west, the shadow tip moves in just the opposite direction. So the first shadow tip mark you make is always WEST, and the second mark is always EAST.

**REMEMBER:** Place your stick vertically into the ground. Mark the tip of each shadow. The first tip is the WESTERN half of your line, and the second tip is the EASTERN half. You can draw a NORTH-SOUTH line perpendicular to your EAST-WEST line.

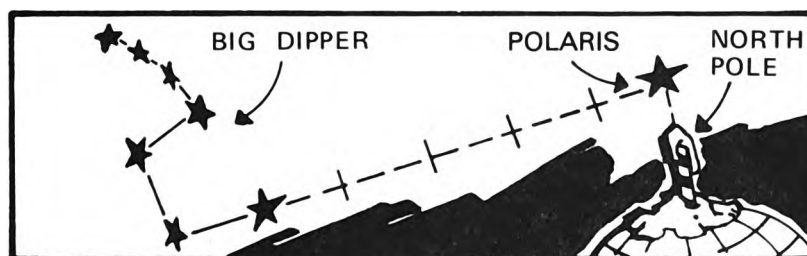


USE THE WATCH DIFFERENTLY IF YOU ARE SOUTH OF THE EQUATOR (SOUTHERN HEMISPHERE) POINT 12-O'CLOCK AT THE SUN. THEN, HALFWAY BETWEEN 12-O'CLOCK AND THE HOUR HAND IS NORTH!



2.

You can also find direction with your watch. It's not as accurate as the SHADOW-TIP method, but it will do in a pinch. North of the equator (northern hemisphere), this is how it works. Point the hour hand at the sun. Then, SOUTH will be half way between the hour hand and twelve o'clock. Try this in a place where you already know the directions to prove that it works.



3.

At night, you can locate north by finding the north star (POLARIS). First, find the Big Dipper. The last two stars in the cup point directly at Polaris, which is about 5 times as far out as the distance between those 2 stars in the cup. Facing Polaris you are looking north, with east on your right and west on your left.

#### REFERENCE:

TC 21-26, Don't Get Lost, Feb 73

TEC Lesson 930-071-0162-F, Determine Direction Using a Field Expedient Method





**TASK NUMBER: 071-329-1006**

---

**NAVIGATE FROM ONE POSITION ON THE GROUND  
TO ANOTHER POINT**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map, compass, a coordinate scale and protractor, and designated start and finish points no more than 3,000 meters apart. The field location of the task should appear on the military map and contain varying types of terrain. Weather conditions should not be considered a limiting factor.

**STANDARDS:**

Within 1 hour, move from the start point to the finish point.

**PERFORMANCE MEASURES:**

1. Locate the start point and finish point on the map and determine where the start point is on the ground.
2. Determine the grid azimuth from the start point to the finish point on the map.
3. Convert the grid azimuth to a magnetic azimuth.
4. Determine the distance between the start point and the finish point on the map.
5. Convert the map distance to pace count.
6. Place the azimuth between the start point and the finish point under the fixed black index line of the compass.
7. When planning the route between points, select terrain features that will be encountered by making a map reconnaissance.
8. Make mental checklist of such features.
9. Move to the start point to begin pace count.
10. While moving along the route, check against your list.
11. After reaching the finish point, conduct a detailed terrain analysis to confirm your location.

**REFERENCES:**

**FM 21-26, Map Reading, C1, Jan 69 (chap 5, pages 5-1 thru 5-18, para 5-1 thru 5-11)**

**TC 21-26, Don't Get Lost, Feb 73(pages 42-46)**

**TEC Lesson 930-071-0018-F, Land Navigating with Map and Compass**

**TEC Lesson 930-071-0165-F, Navigate From One Position on the Ground to Another Point.**

**TASK NUMBER: 071-329-1007**

---

**DETERMINE DISTANCE WHILE MOVING  
BETWEEN 2 POINTS ON THE GROUND**

---

**CONDITIONS:**

Given a 600-meter pace course, a pace factor conversion table to determine your pace count, and a requirement to move by foot over varying types of terrain during daylight hours in all types of weather from a start point to a finish point not less than 500 meters nor greater than 700 meters in length.

**STANDARDS:**

Determine the distance between the start point and finish point to within 5% of the actual distance in a maximum of 45 minutes.

**PERFORMANCE MEASURES:**

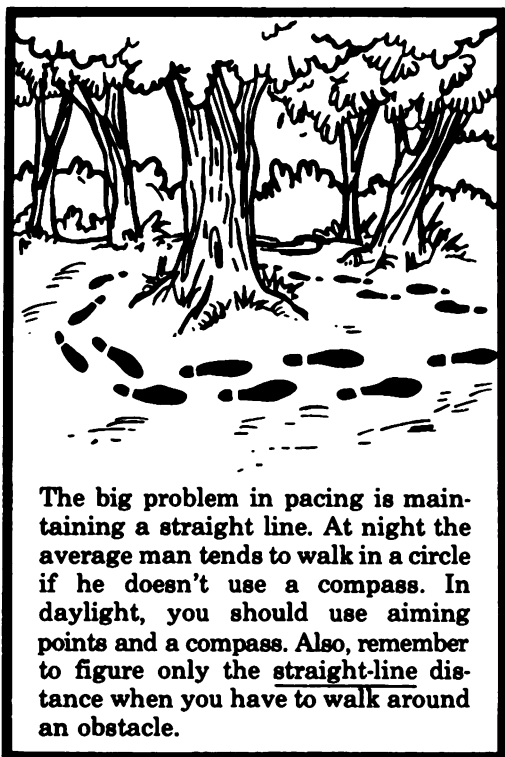
When you have to go a certain distance on foot without any landmarks to guide you, you can measure distance pretty accurately by counting your paces. The average pace is just a little less than one meter. The average man uses 116 paces to travel 100 meters. You should check your pace length by practicing on a known 100-meter distance -- like a football field plus one end zone, which is 110 yards (pretty close to 100 meters).

**BEWARE:** When you travel cross country like you do in the field, you use more paces to travel 100 meters -- usually about 148 instead of 116. This is because you are not travelling over level ground, and you must use more paces to make up for your movement up and down hills. You should pace yourself over at least 600 meters of cross-country terrain in order to learn how many paces it takes you to travel an average 100 meters over cross-country terrain.

Be sure you know how many paces it take you to walk 100 meters both on level terrain and cross country.

IF YOU FIND THAT YOU DON'T TAKE  
116 PACES IN 100 METERS, FIGURE  
OUT HOW MANY PACES YOU DO  
TAKE TO GO 100 METERS.





Another problem is keeping count of paces taken. One way is to use pebbles. For instance, suppose you want to pace off one kilometer. (One kilometer is 1000 meters, or the distance between two of the black grid lines on your map.) Put 10 pebbles in your right pocket. When you go 100 meters move one pebble to your left pocket and start your count over. When all 10 pebbles have been moved to the left pocket, you have travelled one kilometer! Or, you can tie knots in a string -- one knot per 100 meters.



Now let's work a sample problem.

Problem: You are to move 715 meters.

- a. Your pace count for 100 meters is equal to 116 paces.
- b. Using the pebble method, you will need 7 pebbles. This will take you 700 meters. But what about the other 15 meters?
- c. To determine how many paces it will take to go the remaining 15 meters, you simply multiply 15 meters by your pace count (116).
  - (1)  $15 \times = 1740$ .
  - (2) Mark out the last two numbers (40). The remainder is how many paces it will take to go 15 meters (17).
- d. So you would go 715 meters using the pebble method by pacing off 116 paces per 100 meters until all 7 pebbles were used, then go an additional 17 paces to arrive at 715 meters.

**REMEMBER:** When determining your number of paces to go, if it is not a multiple of 100, always multiply the meters remaining by your pace count and mark out the last two numbers in your result.

## REFERENCES:

TC 21-26, Don't Get Lost, Feb 73 (pages 46 thru 49)

TEC Lesson 930-071-0018-F, Navigating with Map and Compass

TEC Lesson 930-071-0164-F, Determine Distance While Moving

**TASK NUMBER: 071-329-1008**

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**MEASURE DISTANCE ON A MAP**

---

**CONDITIONS:**

Given:

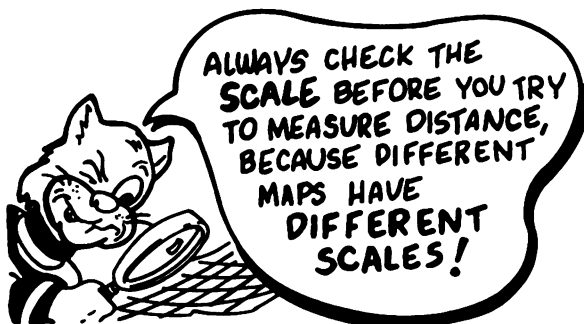
1. A standard 1:50,000 topographic map on which is plotted:
  - a. Point A and point B, 3,000 to 4,000 meters apart.
  - b. Point C and point D, 3,000 to 4,000 meters apart, on a road (trail) which changes direction at least twice.
2. A strip of paper with a straight edge.

**STANDARDS:**

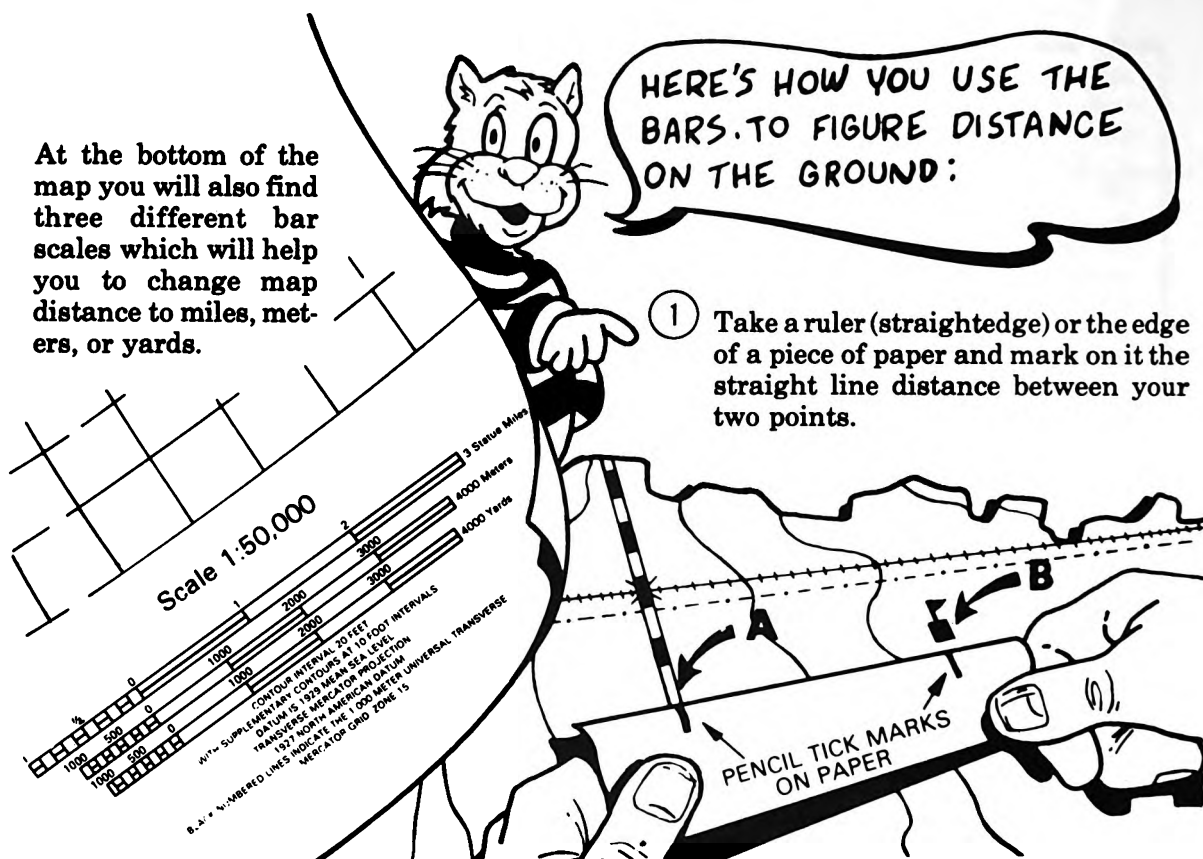
1. Determine the straight-line distance, in meters, from point A to point B within 50 meters, in 3 minutes.
2. Determine the road (curved-line) distance from point C to point D within 100 meters, in 3 minutes.

**PERFORMANCE MEASURES:**

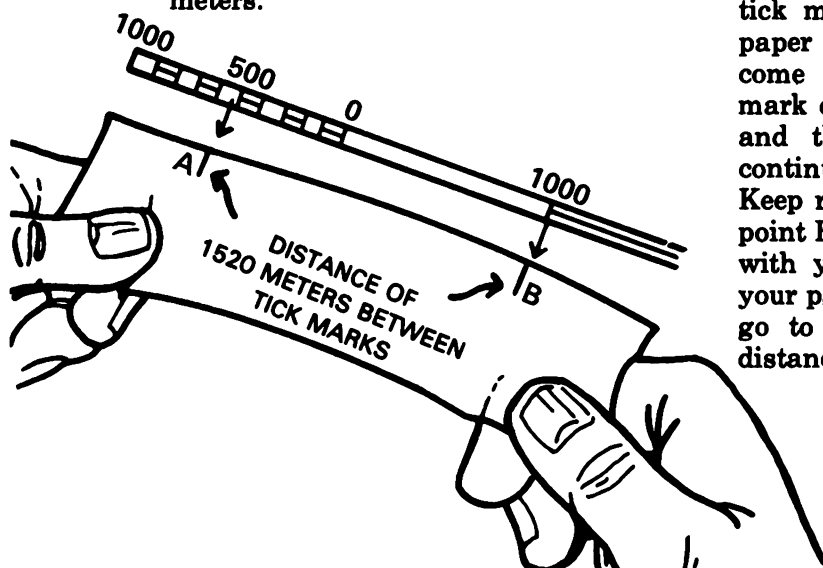
1. You can use your map to measure distance – how far it is between two places. The map is drawn to scale. This means that a certain distance on the map equals a certain distance on the earth. The scale is printed at the bottom and at the top of the map, like this – Scale 1:50,000.
2. This means that 1 inch on the map equals 50,000 inches on the ground. In fact, any ground distance equals 50,000 times that distance on the map.



At the bottom of the map you will also find three different bar scales which will help you to change map distance to miles, meters, or yards.



- 2 Then put the ruler or paper just under one of the bar scales and read the ground distance in miles, meters, or yards. The bar scale in the picture shows a ground distance of 1520 meters.

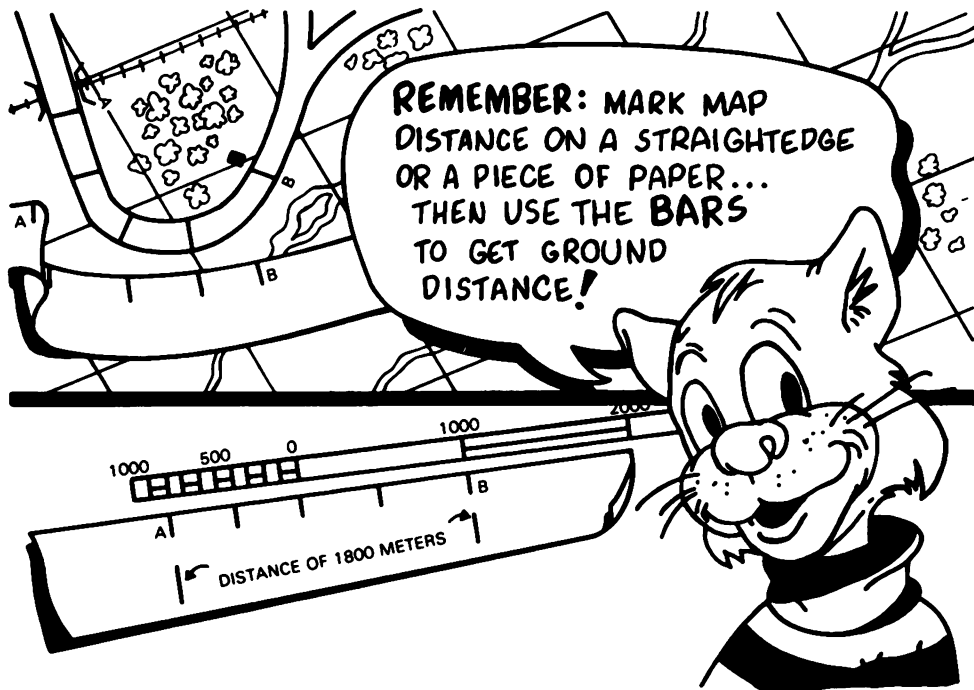


- 3 Suppose you want to find the distance between A and B around a curve in a road. Take a strip of paper, make a small tick mark on it, and line up the tick mark with point A. Aline the paper with the road edge until you come to the curve, make another mark on the paper and on the map, and then pivot the paper so it continues to follow the road edge. Keep repeating this until you get to point B. Always follow the road edge with your paper. Make a mark on your paper where it hits B, and then go to your bar scales to get the distance.

Normally, you will be required to measure distance in meters and you may receive a problem that goes off the bar scale. The meter bar scale allows you to measure distances up to 5,000 meters. If you have to measure distances greater than 5,000 meters, follow this procedure:

a. Step A. Place your starting point on the paper under the zero on the bar scale. Measure off 4,000 meters and place a new tick mark at that point on your paper.

b. Step B. Place this second tick mark also under the zero on the bar scale and determine if the distance on the paper now falls within the bar scale. If it does, add this value to 4,000 to give you your total distance. If it does not, repeat Step A until the distance on the paper falls within the bar scale. Remember to add this last value to the total number of meters you've already measures.



## REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 4, page 4-2, para 4-3)

TC 21-26, Don't Get Lost, Feb 73 (pages 10-13)

TEC Lesson 930-071-0014-F, Land Navigation, Measuring Distances and Azimuths





**TASK NUMBER: 071-329-1004**

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**DETERMINE THE ELEVATION OF A POINT ON THE  
GROUND USING A MAP**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map, pencil, a designated point on the map, and a requirement to determine the elevation of that point.

**STANDARDS:**

Within 1 minute, determine the elevation of the designated point to within  $\frac{1}{2}$  of the value of the contour interval.

**PERFORMANCE MEASURES:****To determine the elevation of a point on a map:**

1. Locate the point on the map. (It may already be plotted on the map, or given as an eight-digit coordinate.)
2. Determine the contour interval of the map from the marginal information.
3. Locate the index contour line nearest the point for which the elevation is being sought.
4. Count the number of contour lines that must be crossed to go from the numbered lines to the point and note direction – “up” or “down”.
  - a. If the point is on contour lines, its elevation is that of the contour.
  - b. For points between contours:
    - (1) Points less than one-fourth the distance between lines are considered to be the same as the elevation of the nearest line.
    - (2) Points one-fourth to three-fourths the distance from the lower line are considered to be at an elevation half the contour interval above the lower line.
  - c. To estimate elevation of the top of an unmarked hill, add half the contour interval to elevation of highest contour line around the hill.

d. To estimate the elevation of the bottom of a depression, subtract half the contour interval from the lowest contour around depression.

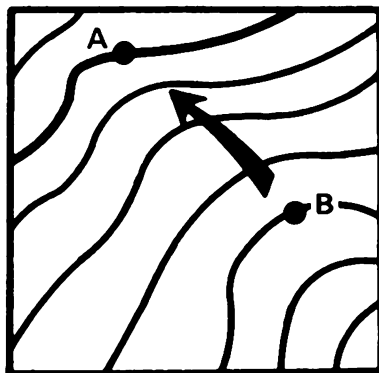
e. On maps that do not show elevation and relief in as much detail as needed, supplementary contour lines may be used. Marginal information indicates the interval, and the supplementary lines are used exactly like solid contour lines.

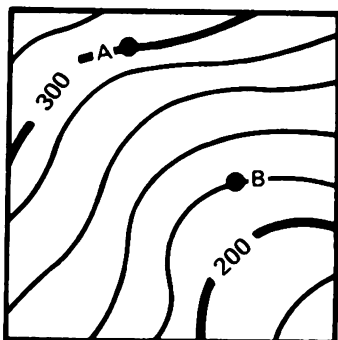
f. Bench marks and spot elevation also indicate points of known elevation.



## ...and this is about **CONTOUR LINES**

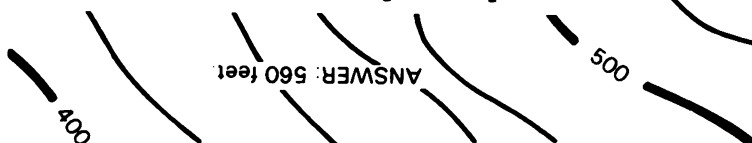
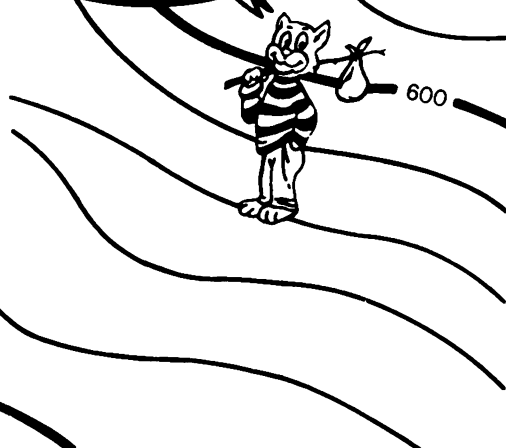
The brown lines on the map are called **CONTOUR** lines. Each line shows the height above sea level. Contour lines never cross one another. Printed at the bottom of the map is the **CONTOUR INTERVAL**, which is the difference in height (elevation) between one brown line and the one next to it. On a map with a scale of 1:50,000 contour interval is usually 20 feet. This would make point "A" 80 feet higher or lower than point "B."





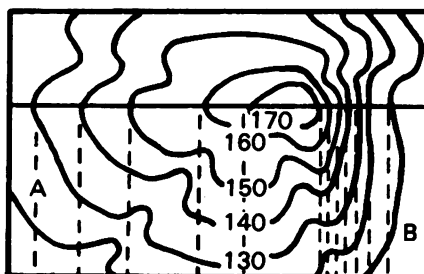
How can you tell from the brown lines whether it's uphill or downhill? Well, every fifth line is heavier than the rest and has a number that gives its elevation. Let's say that the contour interval is 20 feet again. Now you can tell that point "A" is 80 feet higher than point "B." Also, if you knew the ground distance between "A" and "B," you could get an idea of how steep the slope was.

SEE IF YOU CAN FIGURE OUT MY ELEVATION. THE CONTOUR INTERVAL IS 20 FEET. CHECK YOUR ANSWER WITH THE RIGHT ONE BELOW!

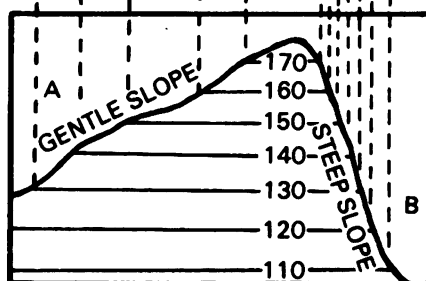


Contour lines widely spaced show a gentle slope. When they are close together the slope is steep.

HILL AS SHOWN ON MAP

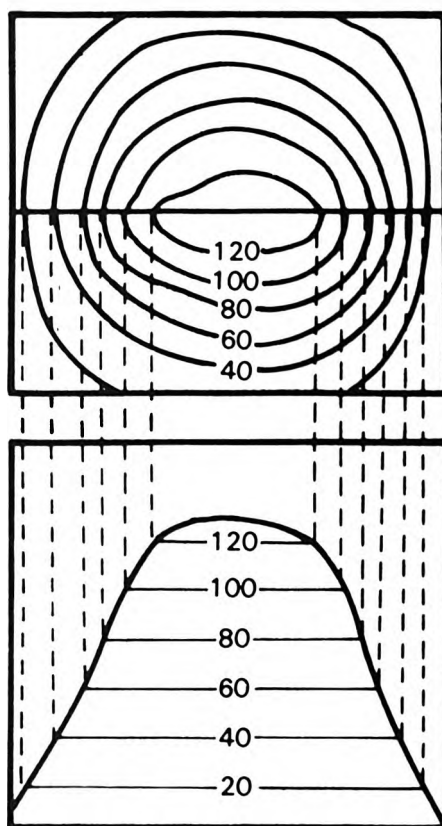
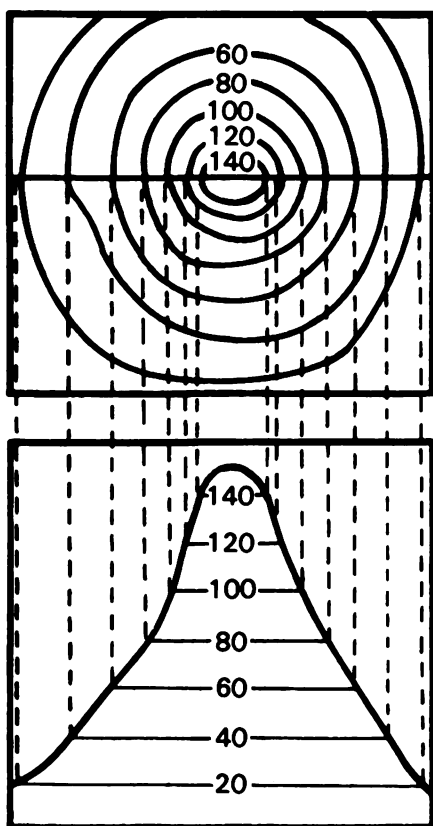


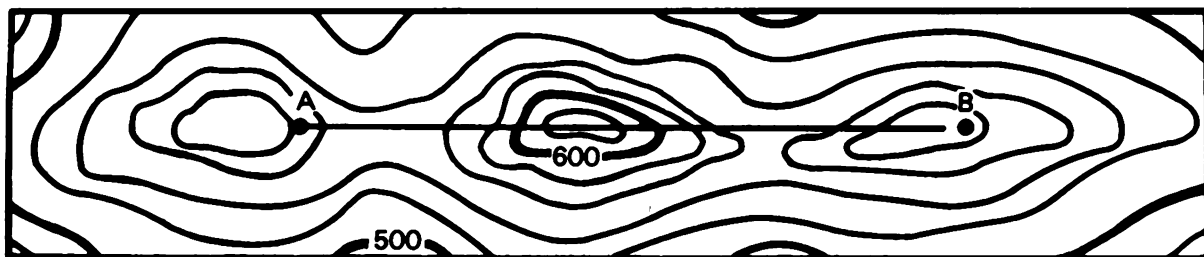
THIS PROJECTED DRAWING SHOWS HOW THE SAME HILL WOULD LOOK FROM THE GROUND! NOTE THAT "A" IS THE "EASY CLIMB" SIDE.



... AND "B" IS THE "SUICIDE"!

When the contour lines are close together at the top of a hill, the hilltop is pointed. The hilltop is flat when the contour lines are widely spaced at the top.





**REMEMBER:** A contour line is a brown line on your map that connects points of the same elevation. You can find the contour interval in the margin at the bottom of your map. The heavy brown lines (every fifth one) have the elevation printed on them. You can tell from looking at your map what the slopes, hills, and valleys will look like on the ground.

## REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 6, page 6-1, para 6-2)  
 TC 21-26, Don't Get Lost, Feb 73 (pages 42-46)  
 TEC Lesson 930-071-0016-F, Terrain Features



**TASK NUMBER: 071-329-1011**

---

**ORIENT A MAP USING A COMPASS**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map and lensatic compass, in a field environment, under daylight conditions.

**STANDARDS:**

Within 1 minute, orient the map to the ground using a compass so that the north-seeking arrow of the compass is within 3 degrees of the angle shown in the G-M angle of the declination diagram shown on the map.

**PERFORMANCE MEASURES:**

1. With the map in a horizontal position, the compass is placed parallel to a north-south grid line with the cover side of the compass pointing toward the top of the map. This will place the black index line on the dial of the compass parallel to grid north. Since the needle on the compass points to magnetic north, we have a declination diagram on the face of the compass formed by the index line and the compass needle.

2. Rotate map and compass until the directions of the declination diagram formed by the black index line and the compass needle match the directions shown on the declination diagram printed on the margin of the map. The map is then oriented.

3. If the magnetic north arrow on the map is to the left of grid north, the compass reading will equal the G-M angle (given in the declination diagram). If the magnetic north is to the right of grid north, the compass reading will equal  $360^\circ$  minus the G-M angle.

4. Remember to point the compass north arrow in the same direction as the magnetic north arrow (2 above), and the compass reading (equal to the G-M angle or the  $360^\circ$  minus G-M angle) will be quite apparent.

5. Some maps have a built-in protractor consisting of a pivot point "P" on the south neatline of the map and several degrees of arc along the north neatline of the map. The G-M line is obtained by connecting pivot point "P" with the appropriate value of the G-M angle (taken from the declination diagram) on the arc. The map may then be oriented by placing the compass parallel to this line and rotating the map and compass until the needle point is aligned with the continuous line formed by the index line and the sighting wire. The map is then oriented.

6. An alternate method is to draw a magnetic north line on the map from any N-S and E-W grid line intersection using the protractor. Aline the straightedge of the compass along this magnetic north line and rotate the map and compass together until the north arrow falls beneath the fixed black index line on the compass.

**NOTE:** If G-M angle is less than 3 degrees, do not line up north arrow.

**REFERENCE:**

**FM 21-26, Map Reading, C1, Jan 69 (chap 5, page 5-10, para 5-7)**  
**TEC Lesson 930-071-0018-F, Land Navigation with Map and Compass**



**TASK NUMBER: 071-329-1005**

---

**DETERMINE A LOCATION ON THE GROUND BY  
TERRAIN ASSOCIATION**

---

**CONDITIONS:**

In the field during daylight hours, while at an unknown location on the ground, given a standard 1:50,000 scale military map of the area, a coordinate scale and protractor, a known point on the ground, and a requirement to determine the six-digit map coordinates of the location.

**STANDARDS:**

Within 15 minutes, determine the six-digit grid coordinates of your location to within 100 meters.

**PERFORMANCE MEASURES:**

1. Determine the four cardinal directions (north, south, east, and west).
2. Determine the type of terrain feature on which you are located.
3. Determine what types of terrain features surround the location.
4. Orient the map.
5. Relate the terrain features on the ground to those shown on the map.
6. Having determined where the terrain features on the ground and those on the map coincide, determine the coordinate location of that point using the coordinate scale and protractor.

**REFERENCE:**

**TEC Lesson 930-071-0018-F, Land Navigation with a Map and Compass**  
**TEC Lesson 930-071-0163-F, Determine a Location on the Ground**



**TASK NUMBER: 071-329-1012**

---

**ORIENT A MAP TO THE GROUND BY  
MAP-TERRAIN ASSOCIATION**

---

**CONDITIONS:**

Given a standard 1:50,000 scale military map in a field site, under daylight conditions.

**STANDARDS:**

You must orient the map to north within 30° in 10 minutes.

**PERFORMANCE MEASURES:**

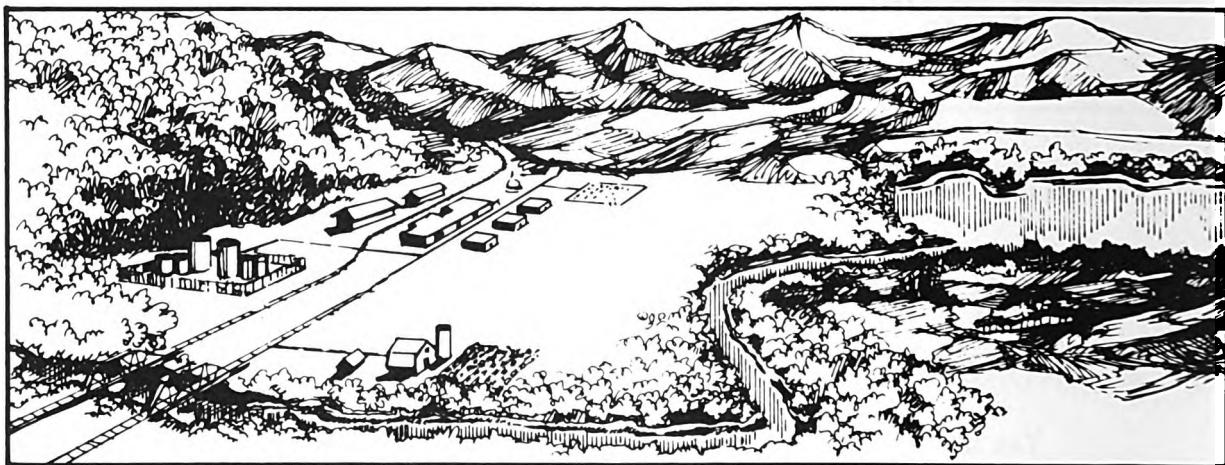
There are many good ways that you can use to locate your position on your map, but first you have to do one important thing.

You've got to point your map so that  
**NORTH, SOUTH, EAST and WEST** on  
the map **POINT THE SAME WAY** as they  
do **ON THE GROUND**.

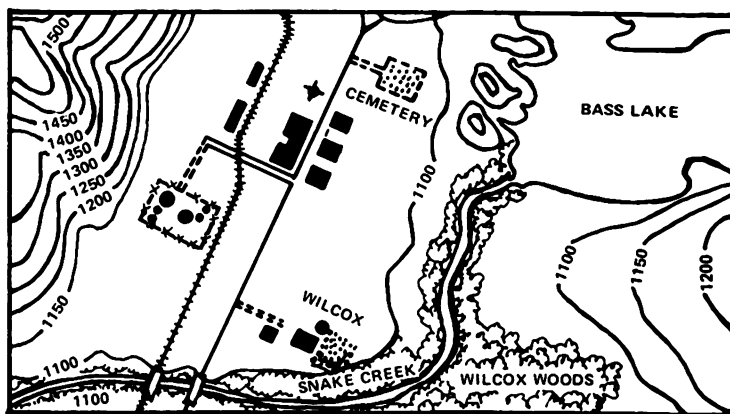
THIS IS CALLED  
**ORIENTING**  
YOUR MAP!



Look at the map and the ground to find two linear features common to both, such as hilltops, saddles, valleys, ridges, and depressions. By aligning the features on the map with the same feature on the ground (figure 1 and 2) the map is oriented.



*Figure 1. An area as viewed from a ground position.*



*Figure 2. Map of the same area as in figure 1.*

#### REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 5, page 5-10, para 5-7)  
 TC 21-26, Don't Get Lost, Feb 73  
 TEC Lesson 930-071-0161-F, Orient a Map by Terrain Association

**TASK NUMBER: 071-329-1014**

---

**LOCATE AN UNKNOWN POINT ON A MAP OR ON THE GROUND BY INTERSECTION**

---

**CONDITIONS:**

In a field location, given a standard 1:50,000 scale military map of the area, the location of two known points, compass, coordinate scale and protractor, pencil, and an object or terrain feature for which you must determine the location (grid coordinates).

**STANDARDS:**

Within 7 minutes (15 minutes, if you must measure azimuths), determine the 100,000-meter square identification letters and six-digit grid coordinates to within 100 meters.

**PERFORMANCE MEASURES:**

Intersection is a method used to locate unknown points on a map by intersecting lines from two known points.

For example: a magnetic azimuth from a known observation post (OP) to an unknown point is changed to a grid azimuth and drawn on the map. Another magnetic azimuth from another known OP location to the same unknown point is changed to a grid azimuth and drawn on the same map. Where the two lines intersect on the map is the location of the distant point.

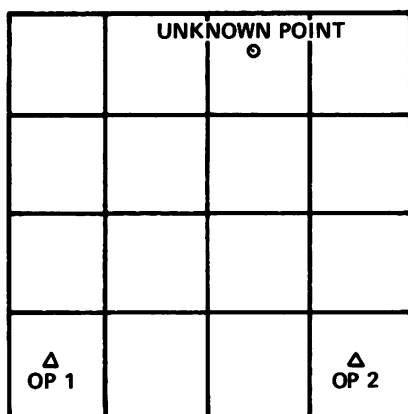
**1. Map and Compass Method (figure 1).**

**NOTE: Map not to scale and an easterly G-M angle of 10° is used.**

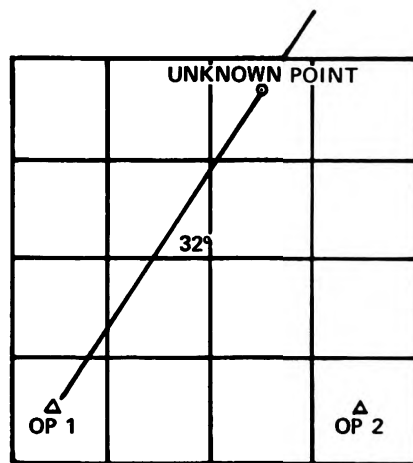
- a. Determine the G-M angle of the map you are using.
- b. Locate and mark your position on the map.
- c. Measure the magnetic azimuth to the unknown point (22°); change it to a grid azimuth. From the magnetic azimuth you found, subtract the G-M angle if it is westerly; add if it is easterly. In the example, the G-M angle used was 10° easterly.
- d. Place the protractor on the map, insuring that the zero degree indicator on the protractor is pointing to the top of the map (north) and the index point is placed center mass on your location (figure 1). Place a tick mark on the number of degrees you want to plot. Draw a line on the map from your position on this grid azimuth (32°).
- e. Move to or call a second known position from which the unknown point can be seen. Locate this position on the map.

f. Repeat c and d above.

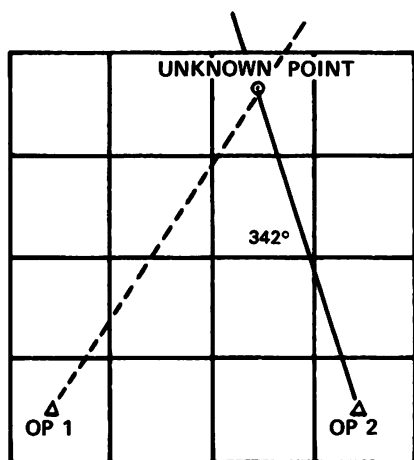
g. Where the lines cross is the location of the unknown point.



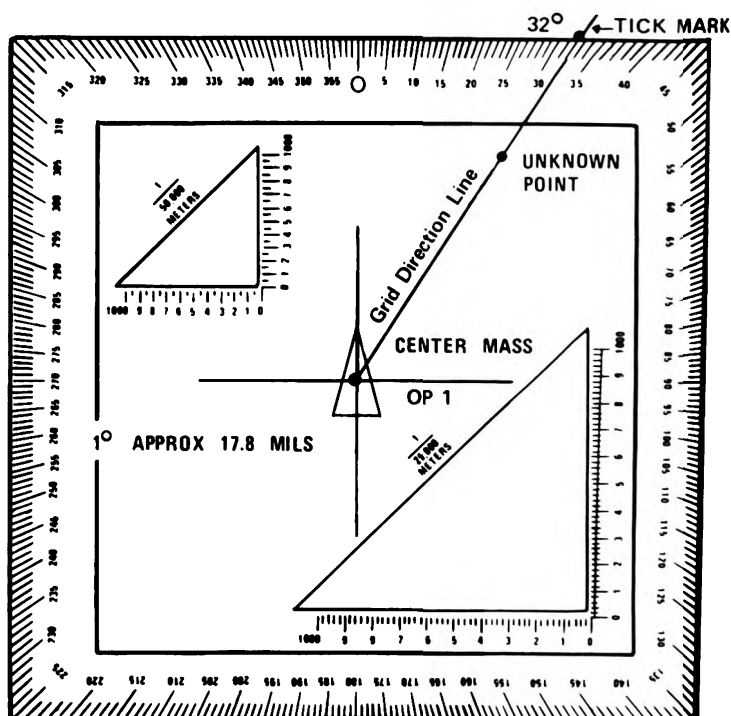
A.



B.



C.

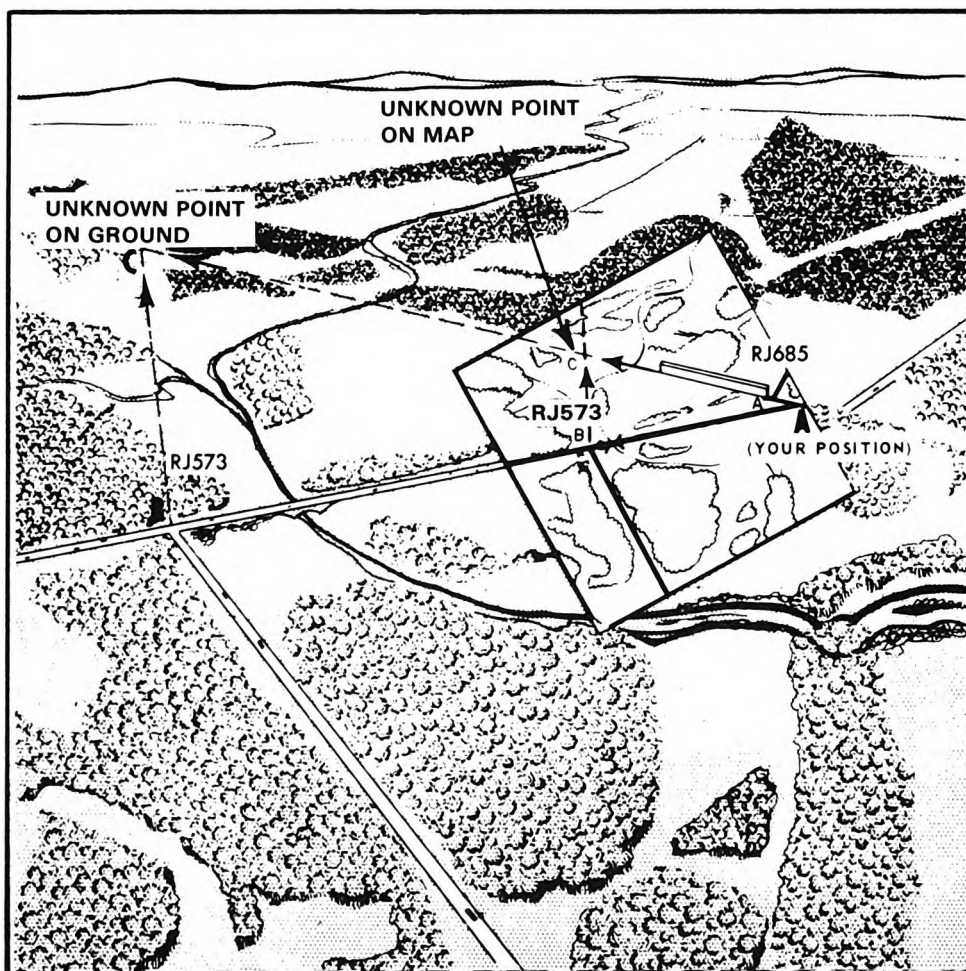


D.

Figure 1.

## 2. Straightedge Method (when no compass is available) (figure 2).

- a. (See task: Orient a map to the ground by map-terrain association.)
- b. Locate and mark your position on the map.
- c. Lay a straightedge on the map with one end at user's position (A) as a pivot point and rotate the straightedge until the unknown point is sighted along the edge.
- d. Draw a line along the straightedge.
- e. Repeat the above procedure at position (B) and for a check on accuracy at a third position.
- f. The intersection is the location of the unknown point (C).



*Figure 2. Intersection without compass.*

### REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 5, page 5-14, para 5-9)  
 TEC Lesson 930-071-0018-F, Navigating with Map and Compass





**TASK NUMBER: 071-329-1015**

---

**LOCATE AN UNKNOWN POINT ON A MAP  
OR ON THE GROUND BY RESECTION**

---

**CONDITIONS:**

In a field at an unknown location, given a standard 1:50,000 scale military map of the area, a compass, straightedge, coordinate scale and protractor, pencil, and two terrain features visible from your location and identifiable on the map.

**STANDARDS:**

Within 10 minutes, determine the 100,000-meter square identification letters and six-digit coordinates of your location to within 100 meters of the actual grid coordinates.

**PERFORMANCE MEASURES:**

RESECTION is a way to locate one's position on a map. Magnetic azimuths are measured to two points on the ground which can be identified on the map. These magnetic azimuths are changed to grid azimuths, and the back azimuths of these grid azimuths are determined. Next, the converted back azimuths are drawn from the known points on the map. Where these two/three lines resect (cross) is your location.

**1. Map and Compass Method (figure 1).**

**NOTE:** A 10° easterly G-M angle is used in the examples. Map not to scale.

**STEP 1:** Determine the G-M angle of the map that you are using.

**STEP 2:** Locate two known positions on the ground and mark them on your map (figure 1a).

**STEP 3:** Measure the magnetic azimuth to one of the known locations: change this to a grid azimuth (figure 1b).

a. If it is a westerly G-M angle, subtract the number of degrees in the G-M angle from your magnetic azimuth.

b. If it is an easterly G-M angle, add the number of degrees in the G-M angle to your magnetic azimuth.

**STEP 4:** Change this grid azimuth to a back azimuth.

**STEP 5:** Place the protractor on the map insuring that the zero degrees indicator on the protractor is pointing to the top of the map (north) and the index point is placed center mass on this location. Place a tick mark on the number of degrees you want to plot. Remove protractor from the map and draw a line on the map from this position on the grid back azimuth you found, in the direction of your unknown position.

**STEP 6:** Repeat steps 3 through 5 for a second and third known position.

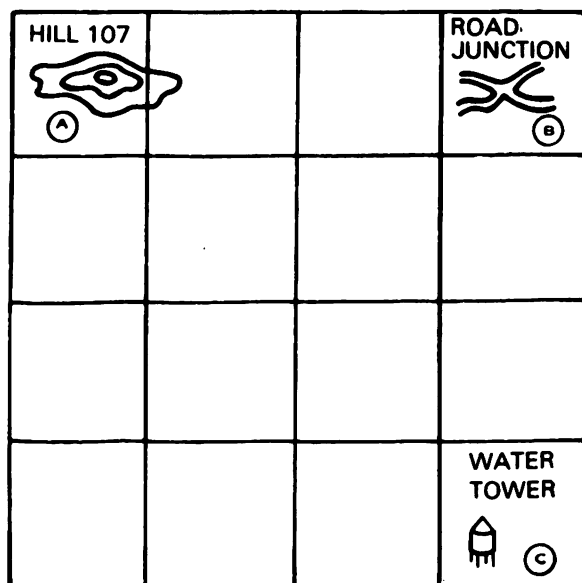


Figure 1a.

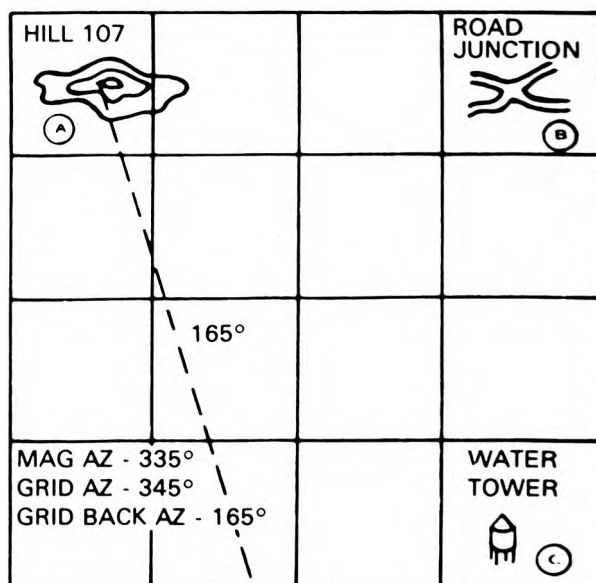


Figure 1b.

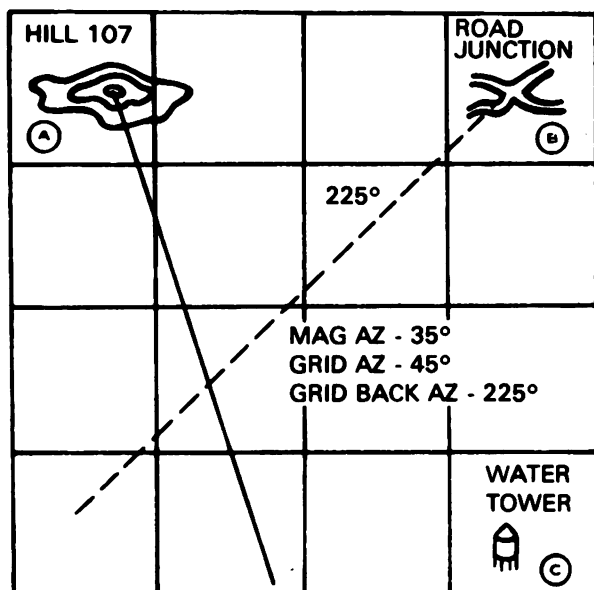


Figure 1c.

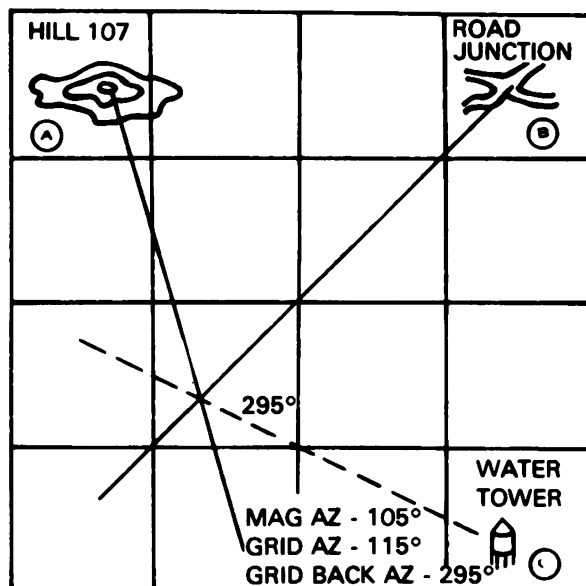
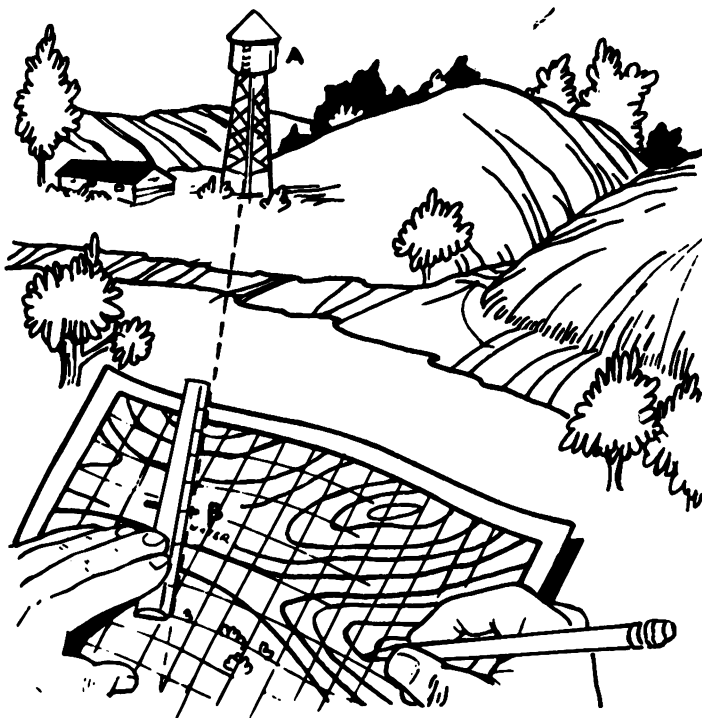


Figure 1d.

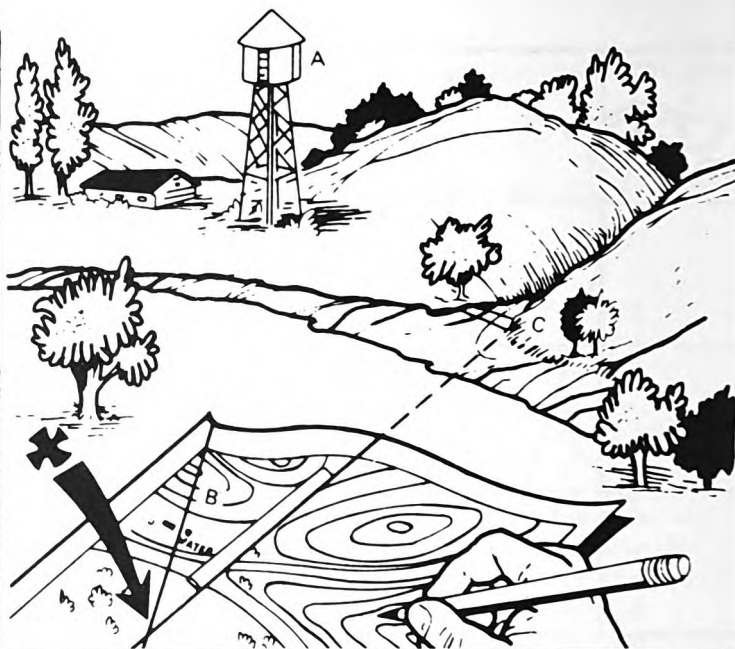
Figure 1.

## RESECTION WITHOUT A COMPASS



Oriend your map as closely as you can using one of the ways you've learned about finding direction—compass, sun, watch, or stars. Then, look for some feature—like a water tower (A)—that you can also find on the map. Put a ruler or straightedge on the map, and place its edge right next to the water tower symbol (B) on the map. Then align the straightedge so that it points exactly at the real water tower. Draw a line along the ruler (the line will cross the symbol for the water tower on your map).

Next, find another feature—like a road junction, and do the same thing. Lay the straightedge on your map and point it at the real road junction (C), while at the same time its edge crosses over the road junction (D) on the map. Draw another line along the ruler until it crosses (intersects) the first line. The point where the lines cross is your location (X). If you do the same thing with a third line, it may help locate your position more accurately.



**REMEMBER:** Don't move your map once you've got it properly oriented.

## MODIFIED RESECTION

First orient your map, then find some feature that you can also find on the map, such as the water tower in the previous example. Just like before, put a straightedge through the water tower on the map and align the straightedge so that it points exactly at the real water tower. Draw a line along the ruler. The point where the line crosses the linear feature which you know you are on (road, river bank, etc.) is your location.

**REMEMBER:** ALWAYS ORIENT YOUR MAP AS CLOSELY AS YOU CAN. THE COMPASS IS THE BEST WAY. IF YOU DON'T HAVE A REGULAR STRAIGHTEDGE, USE YOUR RIFLE CLEANING ROD, A SECTION OF RADIO ANTENNA, OR EVEN THE EDGE OF A C-RATION BOX!



### REFERENCES:

FM 21-26, Map Reading, C1, Jan 69 (chap 5, page 5-15, para 5-10)  
TC 21-26, Don't Get Lost

TEC Lesson 930-071-0018-F, Navigating with Map and Compass

**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION III**

**WEAPONS**

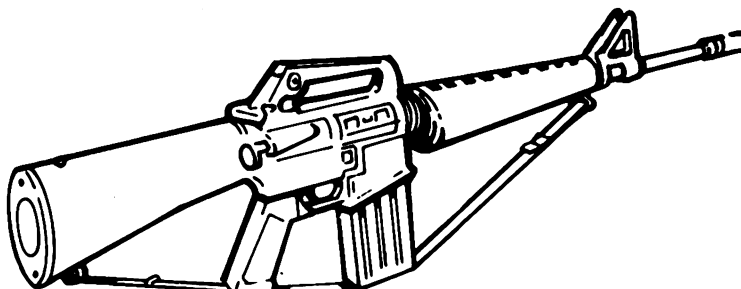
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**TASK SUMMARIES**



## INTRODUCTION M16A1 RIFLE

### FACTS ABOUT YOUR RIFLE



The M16A1 rifle system consists of a rifle, one magazine, and a sling. It is a lightweight, gas-operated, air-cooled, magazine-fed, shoulder-fired weapon that can be fired either automatically or semiautomatically.

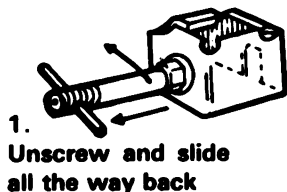
#### Other features:

The barrel assembly has an adjustable sight and a flash suppressor. Upper and lower receivers are easily opened for cleaning and inspection. Bolt group and barrel extension are designed with locking lugs that lock bolt group to barrel extension.

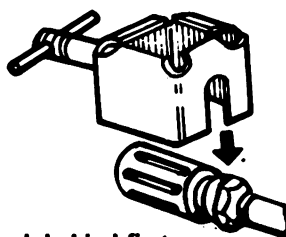
An aluminum receiver reduces the weight of the rifle.

Some rifles are equipped with the Low Light Level Sight to increase effectiveness during periods of limited visibility.

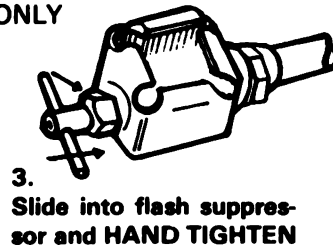
### M15A2 BLANK FIRING ATTACHMENT (BFA)



**NOTE:** After 50 rounds, check to see if it is still tight. Make sure to clean carbon buildup after each use



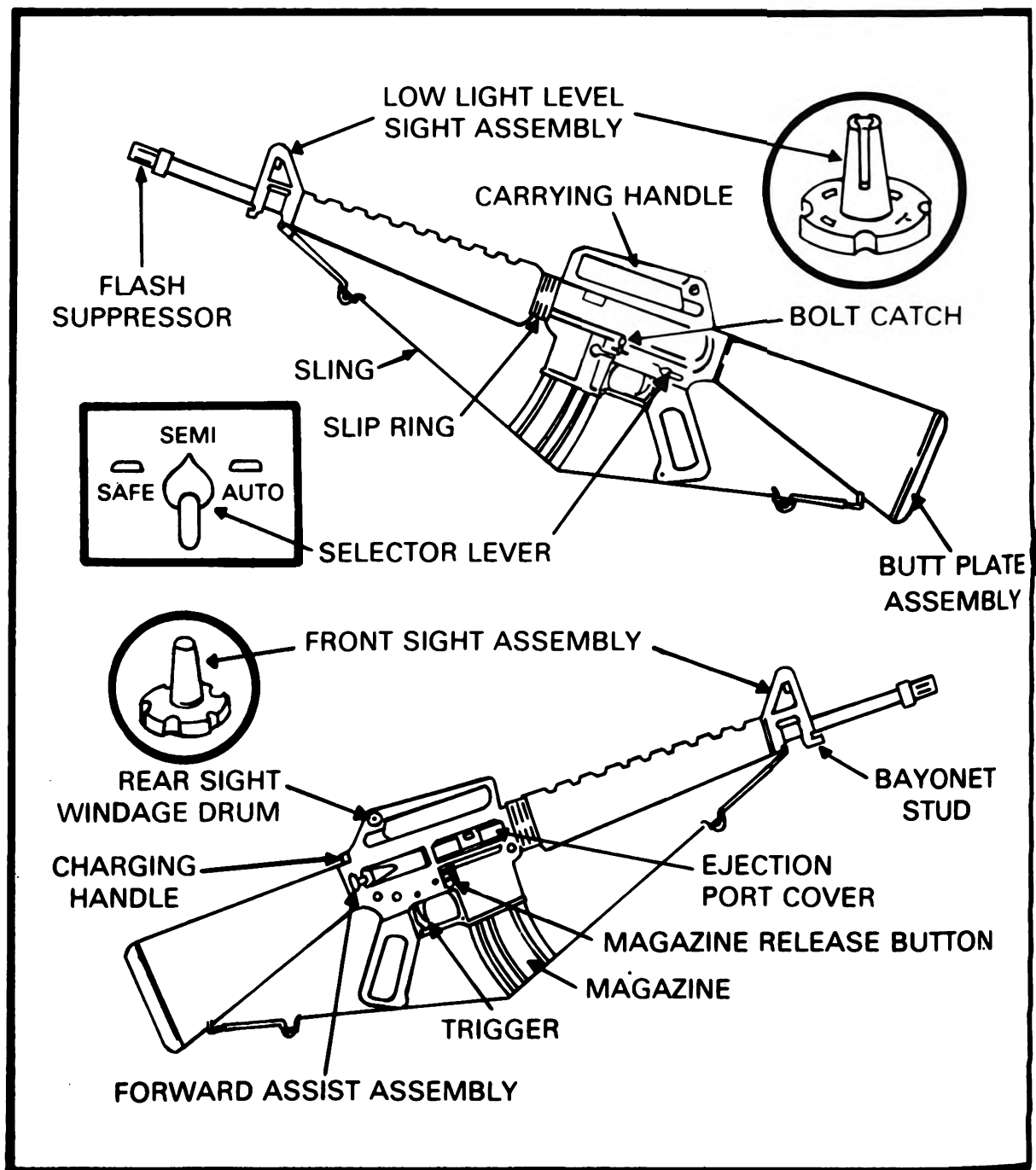
**CAUTION:** Do not use tools to tighten attachment, **HANDS ONLY**



**WARNING**

Use **ONLY** blank M200 with the BFA

# RIFLE PARTS AND WHERE THEY ARE





**TASK NUMBER: 071-311-2001**

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**PERFORM OPERATOR MAINTENANCE ON AN  
M16A1 RIFLE, MAGAZINE, AND AMMUNITION**

---

**CONDITIONS:**

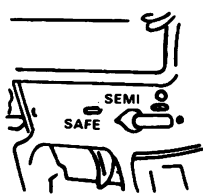

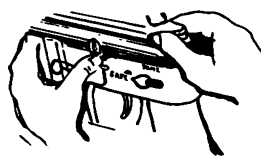
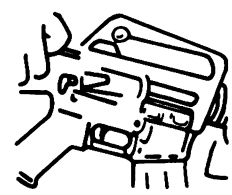

Given an M16A1 rifle, magazine, 5.56-mm ammunition (combat only), and small arms maintenance equipment case (FSN 8465-00-781-9564).

**STANDARDS:**


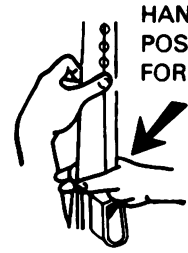
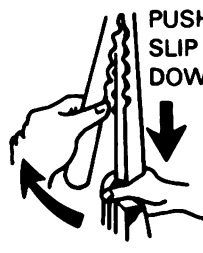
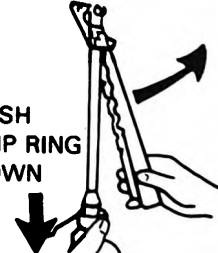
1. Disassemble M16A1 rifle IAW performance measures for disassembly.
2. Clean and lubricate M16A1 rifle IAW performance measures for cleaning and lubricating.
3. Assemble M16A1 rifle IAW performance measures for assembly and conduct a function check.
4. Disassemble, clean and lubricate, then assemble rifle magazine IAW performance measures for care of the rifle magazines.

**PERFORMANCE MEASURES:**

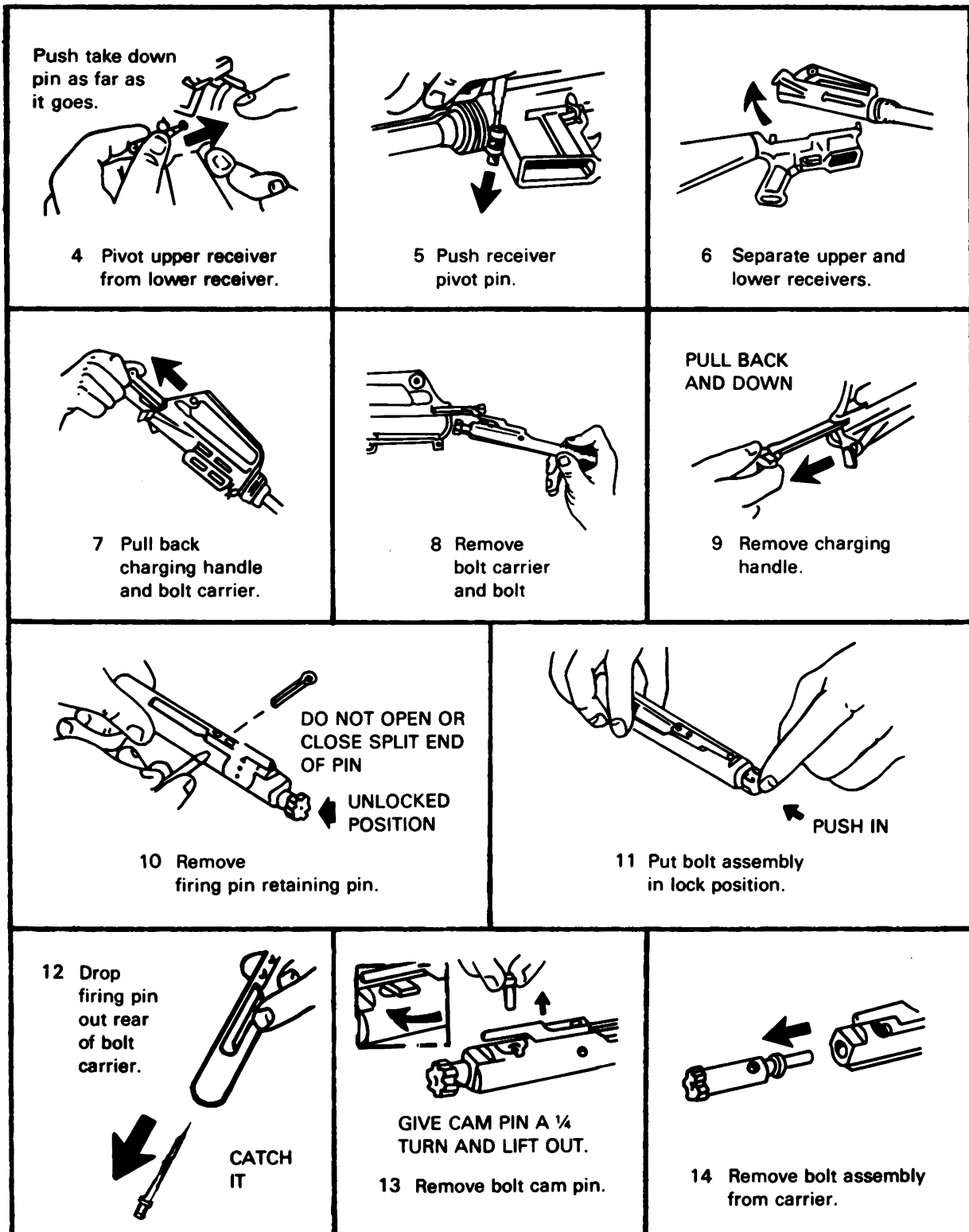
## CLEAR YOUR RIFLE

<p>1 Place selector on <b>SAFE</b>. If weapon is not cocked, lever cannot be pointed toward <b>SAFE</b>.</p> 	<p>2 Remove magazine. <b>PRESS CATCH BUTTON</b></p>  <p><b>PULL MAGAZINE DOWN</b></p>
<p>3 To lock bolt open, pull charging handle rearward, press bottom of bolt catch, allow bolt to move forward until it engages bolt catch. Return charging handle to forward. If you haven't before, place on <b>SAFE</b>.</p>	<p><b>PULL CHARGING HANDLE</b></p>  <p><b>BOLT CATCH</b></p>
<p>4 Eyeball receiver and chamber to insure these areas contain no ammo.</p> 	<p>5 With selector lever pointing toward <b>SAFE</b>, allow bolt to go forward by pressing upper portion of bolt catch.</p>  <p><b>BOLT CATCH</b></p>

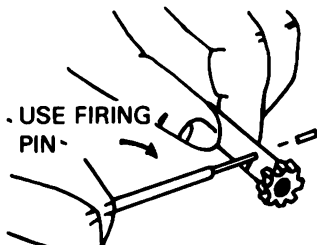
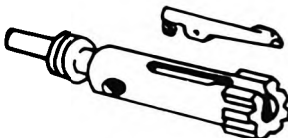
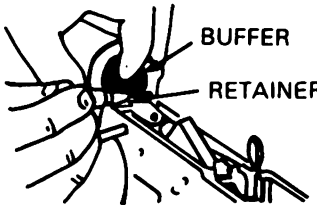
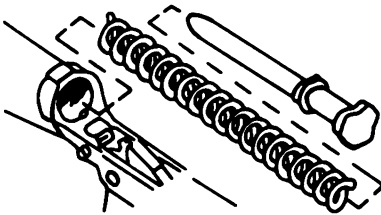

## DISASSEMBLY

<p><b>1</b> <b>first</b> <b>CLEAR</b> <b>YOUR</b> <b>RIFLE</b></p> 	<p>2 Remove sling.</p>
<p><b>NOTE</b> → Remove &amp; clean only if dirt &amp; corrosion can be seen through vent holes.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p><b>HANDS POSITIONED FOR REMOVAL</b></p>  </div> <div style="text-align: center;"> <p><b>PUSH SLIP RING DOWN</b></p>  </div> <div style="text-align: center;"> <p><b>PUSH SLIP RING DOWN</b></p>  </div> </div> <p><b>3 Remove handguards.</b></p>	

## DISASSEMBLY (cont).



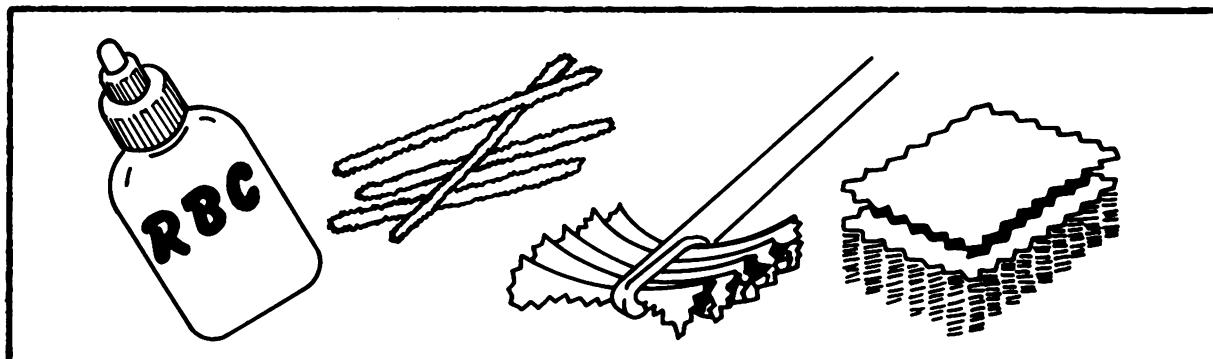
**PERFORM STEPS 15 THRU 18 ONLY WHEN DIRTY OR DAMAGED**

 <p>USE FIRING PIN -</p> <p>15 Remove extractor pin.</p>	<p><b>NOTE</b></p> <p>Press top of extractor to check spring function.</p> <p><b>See your ARMORER</b></p> <p>Do not damage tip of firing pin.</p>	<p><b>DON'T SEPARATE SPRING FROM EXTRACTOR</b></p>  <p>16 Remove extractor and spring.</p>
 <p>BUFFER RETAINER</p> <p>17 Press in buffer, depress retainer and release buffer.</p>	 <p>18 Remove buffer assembly. 19 Separate buffer from spring.</p>	 <p><b>NO FURTHER DISASSEMBLY ALLOWED</b></p>

**2. CLEAN ... INSPECT ... LUBE**

With the rifle disassembled, thoroughly clean, inspect and lube, so you have a reliable weapon you can always depend on.

After firing, clean your weapon for 3 consecutive days with rifle bore cleaner (RBC). Wipe dry and lube according to lubrication instructions.

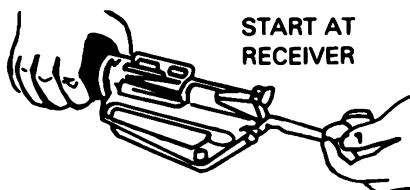


Cleaning materials: swabs, pipe cleaners, and RBC are expendable items that are available from company supply.

If any parts are missing or defective, see your ARMORER.

**CLEANING upper and lower receiver group****CLEAN WITH RBC**

- All Areas of Powder Fouling, Corrosion, Dirt & RUST
- Bore & Chamber
- Locking Lugs
- Gas Tube



GO RIGHT THRU THE  
FLASH SUPPRESSOR



BORE BRUSH (DON'T  
REVERSE DIRECTION  
WHILE IN BORE)



BARREL LOCKING  
LUGS AND GAS TUBE

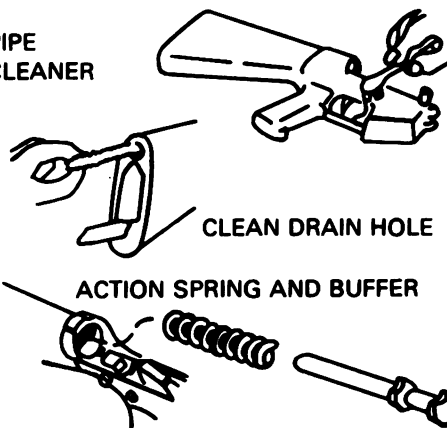
Use a worn bore brush to  
get outside surface of  
protruding gas tube (get  
sides and bottom from  
bottom of receiver)

- All Areas of Powder Fouling, Corrosion, and Dirt
- Wipe Dirt from Trigger Mechanism
- Clean Buffer and Inside Lower Receiver Extension

**CAUTION**

Do not use wire brush  
or any type of abrasive  
material to clean  
aluminum surfaces

PIPE  
CLEANER



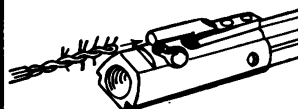
CLEAN DRAIN HOLE

ACTION SPRING AND BUFFER

**CLEANING bolt carrier group**

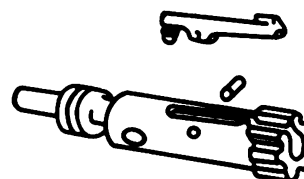
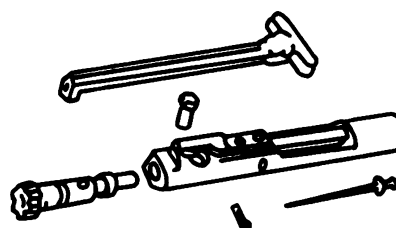
- Outer & Inner Surfaces of Bolt Carrier
- Carrier Key
- Firing Pin Recess and Firing Pin
- Firing Pin Hole (Use Pipe Cleaner There)
- Carbon Deposits & Dirt from Locking Lugs
- Areas Behind Bolt Ring and Under Lip of Extractor

WORN BORE  
BURSH



GET THAT  
LAST 1/16"  
TOO!

CARRIER KEY



## LUBE GUIDE

Under all but the coldest arctic conditions, LSA is the lubricant to use on your rifle. Remember to remove excessive oil from the bore before firing.

**Lightly Lube** - A film of oil barely visible to the eye.

**Generously Lube** - Heavy enough so that it can be spread with the finger.

### Cleaning Rifle.

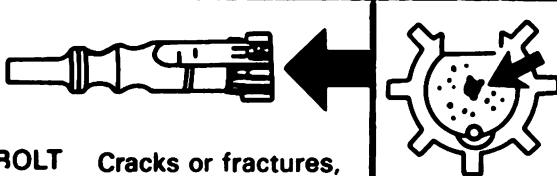
Clean and lightly lubricate with LSA the lugs in barrel extension, bore, and chamber. Clean and lightly lubricate the bolt carrier. Lubricate slide cam pin area, piston rings, outside bolt body, and in bolt carrier key.

**(CAUTION: Apply only a light coat of LSA to firing pin and firing pin recess.)**

Use rifle bore cleaning compound (RBC) to clean powder fouling in the upper receiver. Clean outside surface of protruding gas tube with a worn bore brush. Coat all other surfaces with lubricant. Apply a light coat of LSA to buffer, action spring, and inner surfaces of lower receiver extension. Use generous amount inside lower receiver and on all components.

### INSPECT - before assembly

**WARNING: DO NOT interchange bolts between rifles**



**BOLT** Cracks or fractures, especially in the cam pin hole area. Bolts that contain pits extending into the firing pin hole need replacing



**FIRING PIN RETAINING PIN** - Bent, busted, badly worn



**CAM PIN** - Cracked, chipped or missing



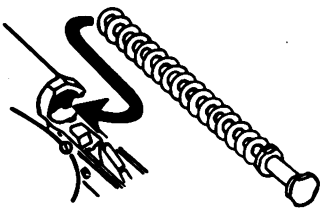
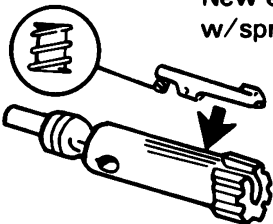
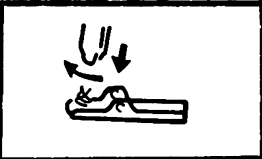
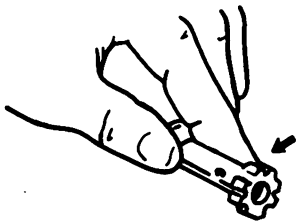
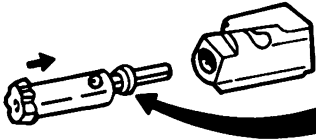
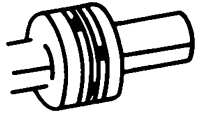
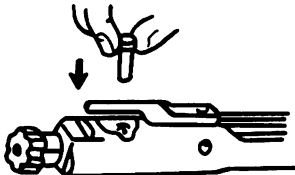
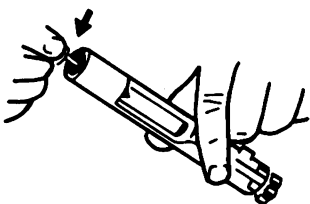
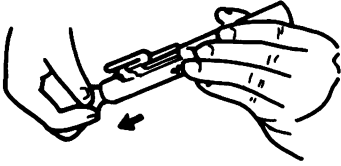
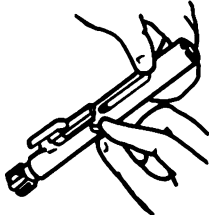
**EXTRACTOR AND EXTRACTOR SPRING** - Check extractor for chipped or broken edges in the area of the lip that engages the cartridge rim.






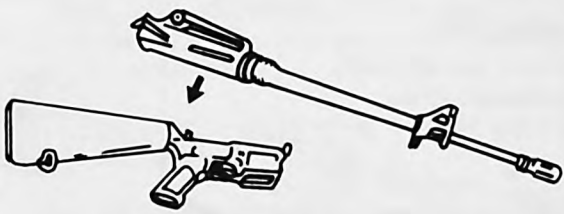

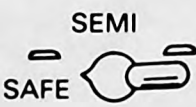
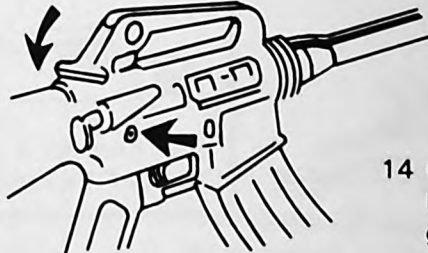



**FIRING PIN** - Bent, cracked or blunted end

IF PARTS ARE MISSING OR DEFECTIVE, SEE YOUR ARMORER

## 3. ASSEMBLY

 <p>1 Insert spring and buffer</p>	<p>New extractor has a silicone insert w/spring. Be sure not to lose it</p>  <p>2 Insert extractor and spring</p> <p>If the spring comes loose, put the large end of spring in the extractor and seat</p> 
 <p>3 Push in extractor pin</p>	<p><b>WARNING</b> Don't switch bolts between rifles</p>  <p>4 Slide bolt into carrier</p> <div>  <p>STAGGER RING GAPS TO STOP GAS LOSS</p> </div>
 <p>5 Replace bolt cam pin</p>	<p>GIVE CAM PIN A ¼ TURN AFTER ASSEMBLY</p>  <p>FIRING PIN</p> <p>6 Drop in and seat</p>
 <p>7 Pull bolt back</p>	<p><b>NOTE</b></p>  <p>8 Replace retaining pin</p> <p>Firing pin should not fall out when bolt carrier group is turned upside down</p>

ASSEMBLY (cont).

 <p>9 Engage, then push charging handle part way</p>	<p>BE SURE BOLT IS STILL UNLOCKED</p>  <p>10 Slide in bolt carrier group</p>	 <p>11 Push in charging handle and bolt carrier group together</p>
 <p>12 Join upper and lower receivers</p>		 <p>13 Engage receiver pivot pin</p>
<p><b>CAUTION:</b> Selector lever must be on safe or semi before closing upper receiver</p> 	 <p>14 Close upper and lower receiver groups. Push in takedown pin</p>	
 <p>15 PUT HANDGUARDS IN PLACE</p>  <p>16 Replace sling</p>	 <p>RELEASE SLIP RING CHECK FOR FULL ENGAGEMENT</p>	

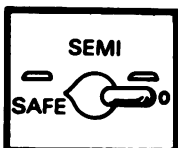
DID YOU INSTALL EVERYTHING?

2-III-A-2.8

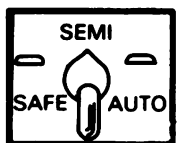


**FUNCTIONAL CHECK**

(REMOVE MAG . . . CHECK CHAMBER)

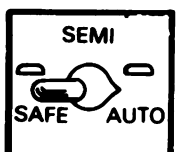
SELECTOR LEVER ON: *safe*

Pull charging handle to rear and release. Place on safe. Pull trigger. Hammer should not fall.

*semi*

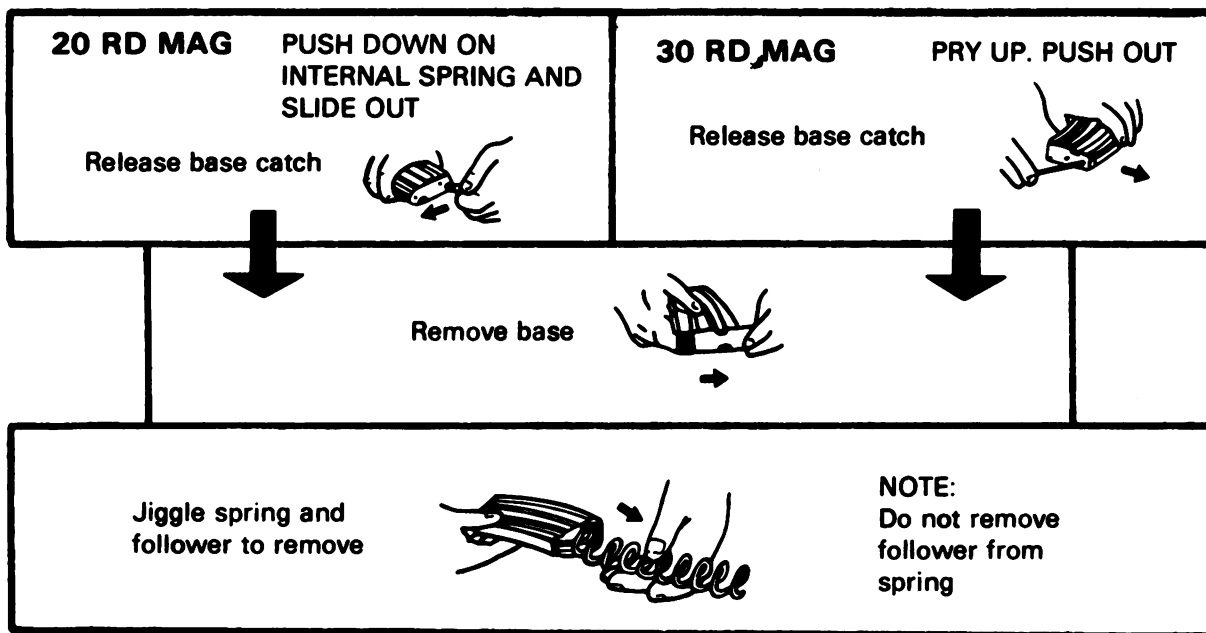
Place selector in semi. Pull trigger and hold to rear. Hammer should fall. Pull charging

handle to rear and release. Release trigger and pull again. Hammer should fall.



*auto*

Place selector in auto. Pull charging handle to rear and release. Pull trigger and hold to rear, hammer should fall. Pull

charging handle to rear and release. Release trigger and pull again. Hammer should not fall.

**MAGAZINE DISASSEMBLY**

## MAGAZINE ASSEMBLY

<p>IF THE SPRING COMES LOOSE FROM THE FOLLOWER, TURN IN THE PIECES DON'T TRY TO FIX IT YOUR SELF</p>	<p>CLEAN &amp; LUBE Wipe dirt from tube, spring, and follower, then lightly lube spring</p>
<p>Jiggle spring and follower to install</p>	
<p>Slide the base under all four tabs</p>	 <p>MAKE SURE PRINTING IS ON THE OUTSIDE</p>

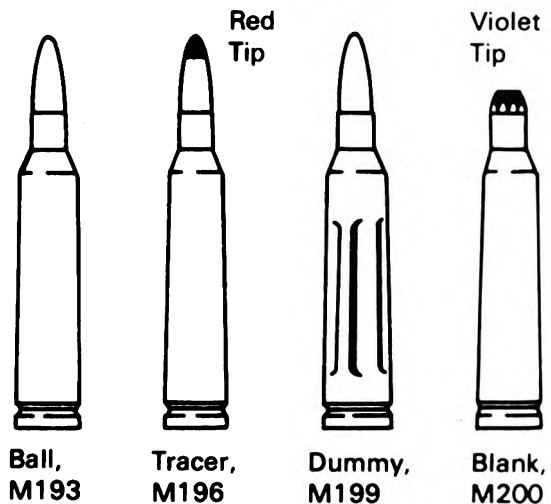
## AMMUNITION

### WARNING

#### DO NOT FIRE . . .

- Seriously corroded ammunition
- Dented cartridges
- Cartridges with loose bullets
- Cartridges exposed to extreme heat (135°) until they have cooled

Use only authorized ammo that is manufactured to US specs.



KEEP DRY, CLEAN, AND FREE OF CRUD.  
YOUR LIFE DEPENDS ON IT!

**Cleaning Ammunition.** Use a clean, dry cloth to wipe dirt and foreign matter from ammunition. Do not coat with oil.

## SARGE'S INSPECTION



Sarge'll gig ya if the following items are not clean . . . .

BOLT,  
SIGHTS,  
RECEIVER,  
CHARGING HANDLE,  
HANDGUARDS,  
GAS TUBE & PORTS,  
STOCK DRAIN HOLE,  
BORE & FLASH SUPPRESSOR,  
MAGAZINE CATCH &  
MAGAZINE WELL

He'll also check the overall condition of the  
SIGHTS, BIPOD, STOCK, & HANDGUARDS.

So, be prepared, keep it clean and lubed.

## REFERENCES:

TM 9-1005-249-10, Operator's Manual, Apr 77 (pages 9 thru 33)  
TEC Lesson 939-071-0010-F, Disassembly and Assembly of the  
M16A1 Rifle  
TEC Lesson 939-071-0011-F, Maintaining the M16A1 Rifle  
GTA 21-1-3, M16/M16A1 Rifle Maintenance Card



## TASK NUMBER: 071-311-2003

LOAD, REDUCE A STOPPAGE, AND CLEAR  
AN M16A1 RIFLE

## CONDITIONS:

Given an assembled and operational M16A1 rifle, a magazine loaded with

1. Live ammunition on a firing range or actual combat situation.
2. Blank ammunition in the field.
3. Dummy ammunition in garrison.



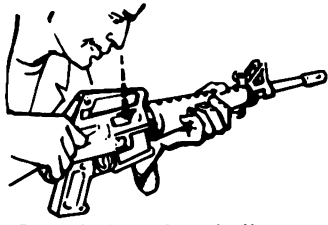

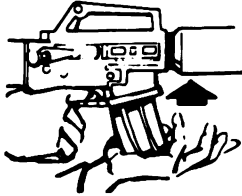
## STANDARDS:

In accordance with the performance measures:

1. Load and chamber a round within 5 seconds.
2. Eliminate stoppages, either real or simulated, within 10 seconds, by using immediate action.
3. Clear the M16A1 rifle within 10 seconds.

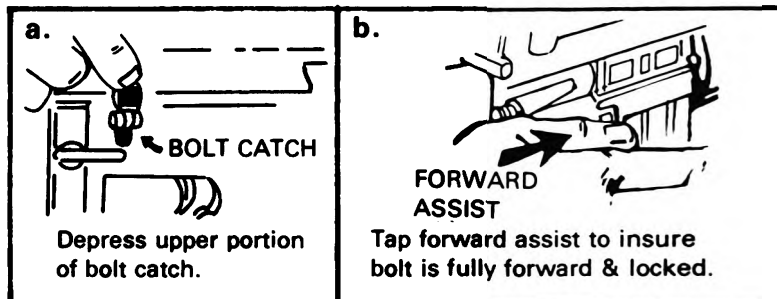
## PERFORMANCE MEASURES:

## ① LOADING A ROUND

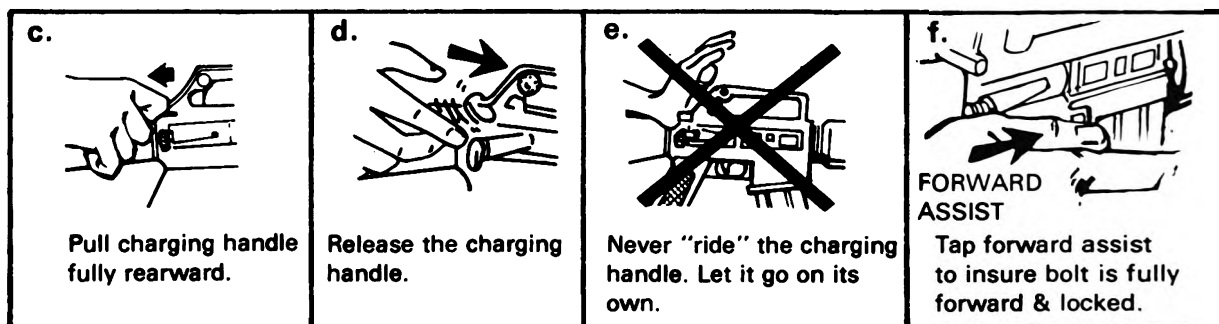
<p>a.</p> 	<p>b.</p>  <p>With hammer cocked, place selector lever on SAFE.</p>	<p>c.</p>  <p>Open bolt and eyeball chamber. Clear?</p>
<p>d.</p>  <p>Push upward until magazine catch engages and holds magazine.</p>	<p>e.</p>  <p>Tap upward to make sure it's seated right.</p>	<p>f.</p> <p>MAGAZINE MAY BE LOADED WITH BOLT ASSEMBLY OPEN OR CLOSED</p>

## ② CHAMBERING A ROUND

### BOLT ASSEMBLY OPEN

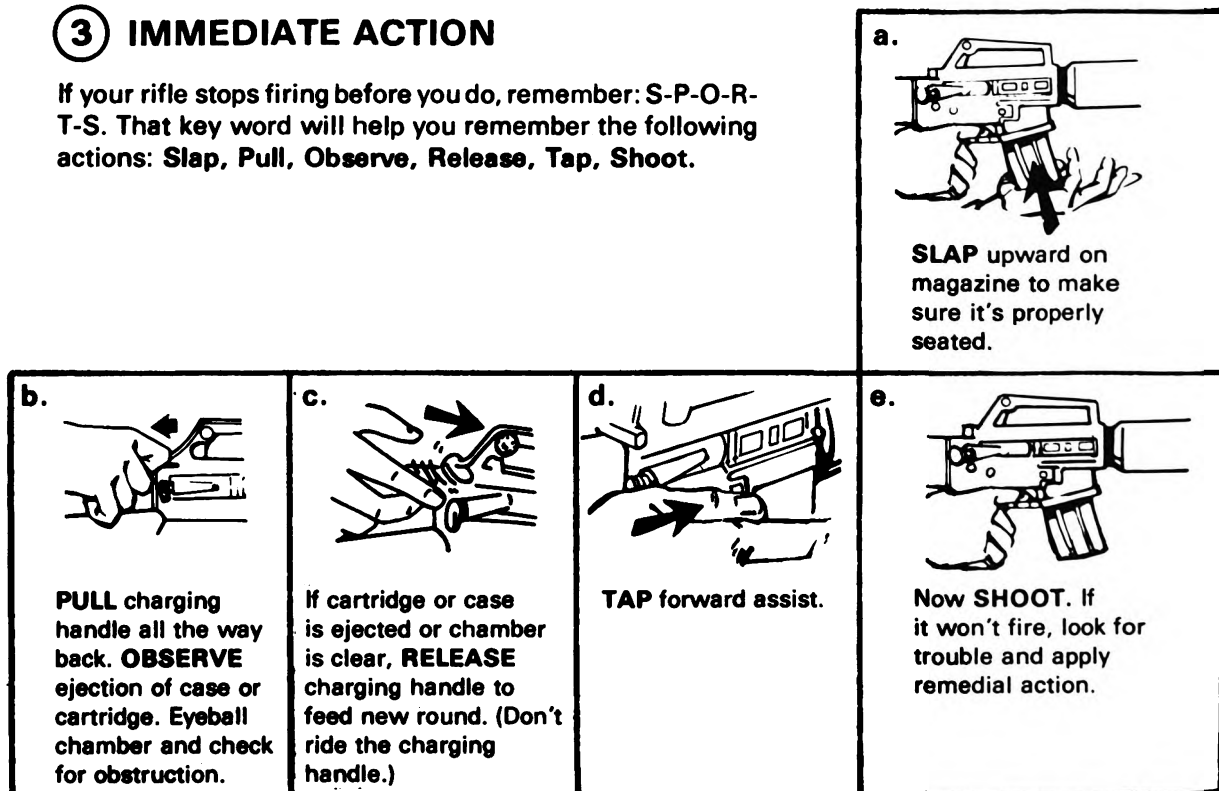


### BOLT ASSEMBLY CLOSED



## ③ IMMEDIATE ACTION

If your rifle stops firing before you do, remember: S-P-O-R-T-S. That key word will help you remember the following actions: **Slap, Pull, Observe, Release, Tap, Shoot.**



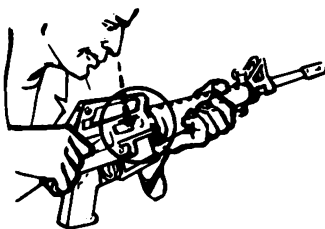
## ④ REMEDIAL ACTION

### WARNING

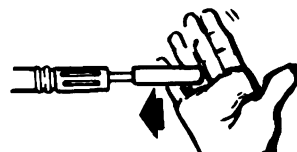
If your rifle stops firing with a live round in the chamber of a hot barrel, remove the round fast. However, during training, if you cannot remove it within 10 seconds, wait 15 minutes with the rifle pointing in a safe direction. This way you won't get hurt by a possible ammo cook-off, which could happen 10 seconds after contact with a hot chamber.

a.

If your rifle fails to fire after performing steps a thru e for immediate action, check again for jammed cartridge case.



b.



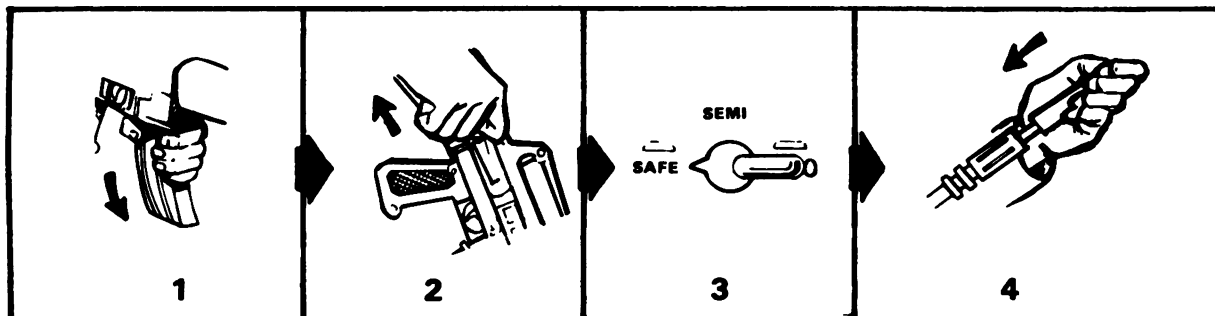
If a cartridge case is in the chamber, tap it out with a cleaning rod.

c. IF YOUR RIFLE STILL FAILS TO FIRE, CHECK TROUBLESHOOTING IN TM 9-1005-249-10, page 48 thru 54.

### WARNING



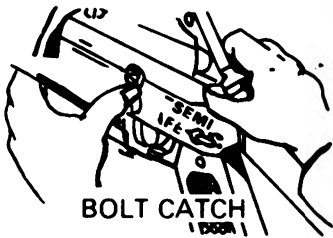

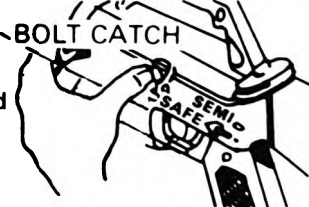
If you hear a "POP" or feel less RECOIL during firing, immediately CEASE FIRE, remove the magazine (1), lock the bolt to the rear (2), and place the selector lever on the "SAFE" position (3). Inspect the bore, or insert a cleaning rod into the bore to insure there is not a round lodged in it (4).

**DO NOT APPLY IMMEDIATE ACTION.**



If a projectile is lodged in the barrel of the weapon, **DO NOT** attempt to remove it. Turn the weapon in to the armorer.

## 5 CLEARING THE RIFLE

<p>a.</p> <p>Place selector on SAFE. If weapon is not cocked, lever cannot be pointed toward SAFE.</p> 	<p>b.</p> <p>PRESS CATCH BUTTON</p> <p>Remove magazine.</p> <p>PULL MAGAZINE DOWN</p> 
<p>c.</p> <p>To lock bolt open, pull charging handle rearward, press bottom of bolt catch, and allow bolt to move forward until it engages bolt catch. Return charging handle to forward. If you haven't before, place on SAFE.</p> 	<p>d.</p> <p>Eyeball receiver and chamber to insure these areas contain no ammo.</p> 
<p>e.</p> <p>With selector lever pointing toward SAFE, allow bolt to go forward by pressing upper portion of bolt catch.</p> 	

### REFERENCES:

TM 9-1005-249-10, Operator's Manual M16A1 Rifle, Apr 77 (pages 11, 36-37, 42-45)

TEC Lesson 939-071-0009-F, Loading and Unloading the M16A1 Rifle

TEC Lesson 939-071-0012-F, Preventing and Correcting Common Malfunctions



## TASK NUMBER: 071-311-2004

## BATTLESIGHT ZERO AN M16A1 RIFLE

## CONDITIONS:

On a 25-meter firing range, given an M16A1 rifle equipped with either the standard M16A1 sights or the low light level sight system (LLLSS), 18 rounds of 5.56-mm ammunition, battlesight zero target, sandbag for support, and a rifle shot group analysis card: semi-automatic fire with M16A1 and M14 rifles (GTA 21-1-4, Mar 74).

## STANDARDS:

Place the center of a three-round shot group at the X - 2.4 centimeters below the Canadian bull's-eye, and have the shot group touch or fall within a 5.2-centimeter-diameter circle centered on the X.

## PERFORMANCE MEASURES:

1. **Sights.** The M16A1 rifle has two adjustable sights. Elevation adjustments are made on the front sight and windage adjustments are made on the rear sight. The rifle comes equipped with either the standard sight system or LLLSS.

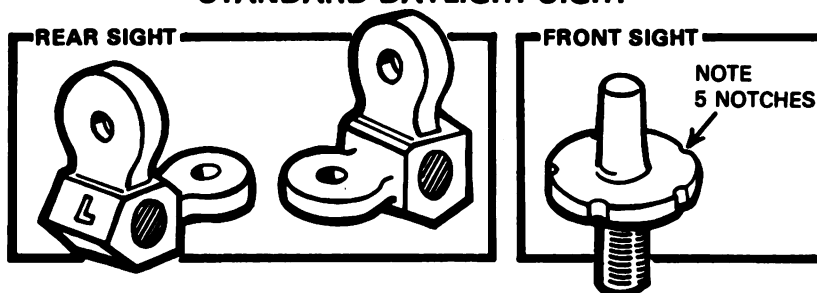
## a. The Standard Sight System.

## (1) The rear sight has two parts:

(a) An aperture marked "L" for ranges beyond 300 meters and an unmarked aperture for ranges from 0 to 300 meters.

(b) A windage drum for windage adjustments.

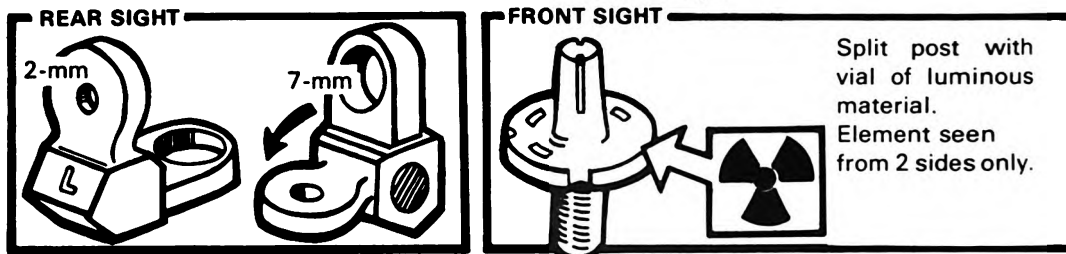
## STANDARD DAYLIGHT SIGHT



(2) The front sight consists of a rotating sight post with a spring-loaded detent.

## b. The Low Light Level Sight System.

NOTE: Not every rifle will have this sight



(1) The rear sight in this system also has two parts:

(a) A 2-mm aperture marked "L" which is used for zero and ranges to 460 meters under normal conditions. The other aperture (7-mm) is larger than the standard sight and is used for night and limited visibility firing.

(b) A windage drum for windage adjustments (same as standard system).

(2) The front sight has only four notches (clicks) of elevation (the standard system has five). This permits the firer to adjust the sight so he can see the luminous part through the rear sight.

**CAUTION:** The front sight post contains a small glass vial of radioactive promethium 147. Take care not to bump, abuse, tamper with, or alter the post in any manner. DO NOT blacken or soot-up the front sight.

## 2. Sight Adjustment (low light and standard).



a. Rear Sight. To adjust windage, depress detent and rotate drum to desired direction. To move point of impact to right, turn drum clockwise in direction of arrow and letter R. To move left, move drum counterclockwise. Each graduation (notch) moves the point of impact of bullet as indicated in chart.

b. Front Sight. To adjust elevation, depress detent, rotate post. To raise strike of bullet, rotate post in the direction of arrow marked up. Reverse the direction of rotation to lower strike of bullet. Each graduation (notch) moves the point of impact of bullet as indicated in chart.

IMPACT		DISTANCE
STANDARD	LOW LIGHT LEVEL	
0.7cm (17/62in)	0.9cm (23/64in)	25 meters
2.8cm (1-3/32in)	3.5cm (1-3/4in)	100 meters
5.6cm (2-13/64in)	7.0cm (2-3/4in)	200 meters

### 3. Battlesight Zeroing.

a. **Sight Picture.** In aiming, the firer is concerned with correctly pointing his rifle so the bullet will hit the target when he fires. To do this, he must have the rear sight, the front sight post, and the target or aiming point in their proper relationship—known as sight picture. A correct sight picture is obtained when the sights are perfectly aligned and the aiming point (target) is in the correct relationship to the front sight post (figure 2b). Sight picture includes two basic elements: sight alinement and placement of the aiming point.

b. **Sight Alinement.** To obtain correct sight alinement, the sights are alined as shown in figure 2a. Notice that the top center of the front sight post is exactly in the center of the rear sight aperture. If an imaginary horizontal line were drawn through the center of the rear sight aperture, the top of the front sight post would touch this line. If an imaginary vertical line were drawn through the center of the rear sight aperture, the line would bisect the front sight post. The firer insures that he has perfect sight alinement by concentrating his attention and focusing his eye on the front sight post through the indistinct or fuzzy appearing rear sight aperture. By doing this, any errors in sight alinement can be easily detected and corrected.

c. **Placement of the Aiming Point.** The aiming point (target on which the firer has alined his rifle sights) is correctly placed when it is centered on and appears to touch the top of the front sight post (figure 2c). If the aiming point is correctly positioned, an imaginary vertical line drawn through the center of the front sight post will appear to split the front sight post in half.

d. **Battlesight Zero Target.** The standard 25-meter target (figure 1) is used when determining the battlesight zero for the M16A1 rifle. Vertical and horizontal lines are printed on the target, forming 1.4-centimeter squares. One click of elevation or windage will move the strike of the bullet 0.7 centimeters at a range of 25 meters. Thus, on the 25-meter target, two clicks of elevation or windage will move the strike of the bullet one square.

**NOTE:** The LLLSS has only four clicks of elevation, but it is adjusted the same as the standard sight. The difference in sight movement per click is not critical during firing.

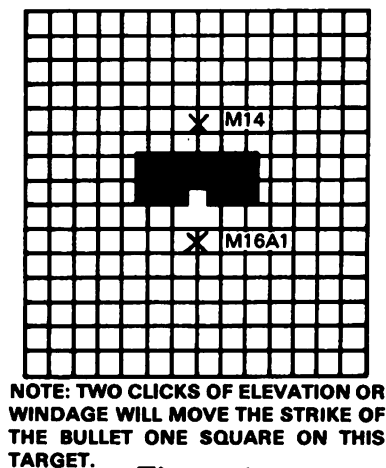


Figure 1.

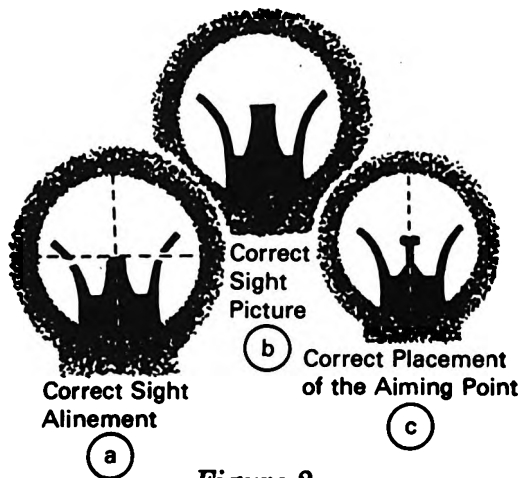


Figure 2.

e. **Determining the Battlesight Zero.** The 250-meter battlesight zero is determined by firing a series of three-round shot groups at the 25-meter target. The firer aims at the distinctive aiming point at the bottom center of the black rectangle (base of the white cutaway portion) and adjusts his sights until the center of this acceptable shot group is located 5.2 centimeters directly below the aiming point (figure 3) on or around the X.

### BATTLESIGHT ZERO

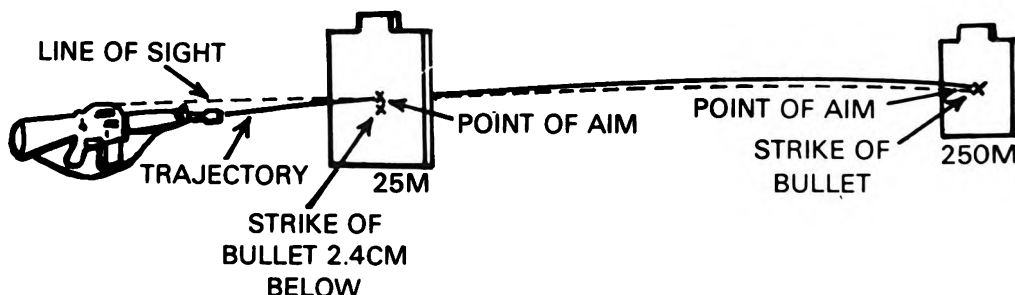
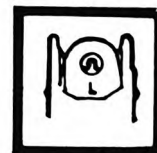


Figure 3.

**NOTE:** To battlesight zero, adjust your sights so you can hit an aiming point at 250 meters. Zeroing can also be done on a 25-meter range by adjusting the sights so that the bullet will strike 2.4 centimeters below the point of aim. If your M16A1 has an LLLSS and you can't see the vial after zeroing, turn front sight post one click down for use during periods of limited visibility.

#### 4. Using Low Light Level (Promethium) Sight System.

a. During daylight firing, use aperture marked L. Effective range is 250 meters (original battlesight zero).



b. At night and in limited visibility, use unmarked (7-mm) aperture. Obtain good sight picture using daylight procedure. After target detection, obtain good sight alinement by centering top of luminous portion of front sight post within 7-mm aperture on target and fire. Under certain light conditions, front sight post can be seen, but you can't determine whether you are looking through, above, or to the side of rear sight aperture. Practice positioning stock against shoulder and looking through rear aperture.



#### REFERENCES:

FM 23-9, M16A1 Rifle and Rifle Marksmanship, Jun 74 (chap 3, page 58, chap 4, pages 83 thru 86)  
 TM 9-1005-249-10, Operator's Manual, M16A1 Rifle, Apr 77 (pages 34-35; 38-41)

## TASK NUMBER: 071-311-2007

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### QUALIFY WITH THE M16A1 RIFLE

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#### CONDITIONS:

**Situation 1: Daylight Firing.** On a standard record firing range, given a zeroed M16A1 rifle equipped with either the standard M16A1 rifle sights or the promethium sights, 4 magazines of 10 rounds each, a record fire scorecard, and the requirement to fire record fire for qualification.

**Situation 2: Night Firing.** On a standard night fire record range, given a zeroed M16A1 rifle equipped with either the standard M16A1 rifle sights or the LLLSS sights, 3 magazines of 3 rounds each for practice firing and 80 rounds for record fire, and the requirement to fire night record fire for qualification.

#### STANDARDS:

**Situation 1:** Attain a **MINIMUM SCORE** of 17 hits out of a possible 40 exposures.

**Situation 2:** Attain a **MINIMUM SCORE** of 20 hits out of a possible 40 exposures.

**SQT ADMINISTRATION REQUIREMENTS:** SQT credit will be awarded as follows:

Arms Qualification/Evaluation	SQT Units
Unqualified (NO GO)	0
Marksman (GO)	1
Sharpshooter (GO)	1
Expert (GO)	1
Nonobserved	Neither count for nor against total SQT score.

The night-firing portion of arms qualification will not be included in the performance certification component of the SQT.

---

**QUALIFICATION SCORES AND RATINGS:**

	<b>STANDARD RECORD</b>	<b>KNOWN DISTANCE</b>	<b>COURSE "C"</b>
Possible	40	500	42
Expert	28-40	420-500	31 and above
Sharpshooter	24-27	360-419	24-30 inclusive
Marksman	17-23	300-359	11-23 inclusive
Unqualified	16 and below	299 and below	10 and below

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**NOTE: FM 23-9 superseded FM 23-71; however, premobilization readiness proficiency "C" courses prescribed for use by reserve components were inadvertently omitted from 23-9 as was change 1 to FM 23-71 (Feb 68) which added appendix I for those units which have only known-distance facilities. These courses of fire may be used unless superseded by subsequent instructions. The following conditions and standards are to be used by units that DO NOT have a standard record fire range.**

**CONDITIONS:**

**Situation 3: During daylight on a known-distance range (as described in para 5 of appendix I, FM 23-71, change 1), given a zeroed M16A1 rifle, 50 rounds of caliber 5.56-mm ammunition (5 magazines of 10 rounds each to engage each target with 10 rounds), a requirement to fire, Record Firing, Known Distance (total rounds 100) as outlined in para 16d, appendix I of FM 23-71.**

**Situation 4: During daylight on a 1000-inch range, given a zeroed M16A1 rifle, 42 rounds of caliber 5.56-mm ammunition, a requirement to fire standard course "C" for record fire as outlined in appendix D of FM 23-71.**

**STANDARDS:**

**Situation 3: Fire Known-Distance Record Firing Table as outlined in para 16, appendix I of FM 23-71 (change 1) and achieve a minimum score of 300.**

**Situation 4: Fire Record Fire Course "C" as outlined in appendix D of FM 23-71 and achieve a minimum score of 11.**

# WARNING

## DANGEROUS PROCEDURES

- Be sure the cam pin is installed in the bolt group. If it isn't, your rifle can still fire, but it could possibly explode, causing you harm.
- DO NOT exchange or switch bolt assemblies from one M16A1 to another . . . It could cause damage to both you and the rifle.
- If your rifle stops firing with a live round in the chamber of a hot barrel, remove the round fast. However, during training, if you cannot remove it within 10 seconds, wait 15 minutes with the rifle pointing in a safe direction. This way you won't get hurt by a possible ammo cook-off, which could happen 10 seconds after contact with a hot chamber.
- Use only authorized ammo that is manufactured to U.S. specs.
- If your bolt fails to unlock and you try to free it by banging the butt stock on the ground, keep yourself clear of the muzzle.
- If there's water in the barrel, don't fire the rifle. It could explode.
- If a noticeable difference in sound or recoil is experienced, STOP FIRING. Either condition could indicate an incomplete propellant burn and a bullet still in the bore. Retract bolt slowly and remove fired cartridge case. Clear weapon and check for unburned powder grains in the receiver or bore and for a bullet in the bore. Remove unburned propellant or bullet from bore before resuming firing, or barrel could explode. If bullet is lodged in bore, turn in rifle to direct support maintenance.

## REFERENCES:

FM 23-9, M16A1 Rifle and Rifle Marksmanship, Jun 74 (chap 9, sec II, page 125) (C1)  
TM 9-1005-249-10, Operator's Manual, M16A1 Rifle, Apr 77





## TASK NUMBER: 071-311-2006

## USE LIMITED VISIBILITY FIRING TECHNIQUES WITH THE M16A1 RIFLE

### CONDITIONS:

As a member of a rifle squad in a defensive position during daylight, given an M16A1 rifle, a magazine and ammunition, sticks or rocks and a board or log available in the area, and instructions on the individual's preplanned sector of fire for use during periods of limited visibility.

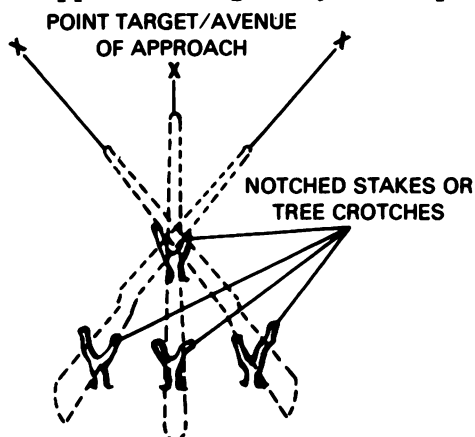
### STANDARDS:

Emplace and aline aiming and firing stakes on identifiable probable enemy avenues of approach, assault positions, and automatic weapons positions, to include left and right limiting stakes (one may be parapet) indicating individual's preplanned sector of fire limits, so that when the weapon is employed using the stakes, rounds:

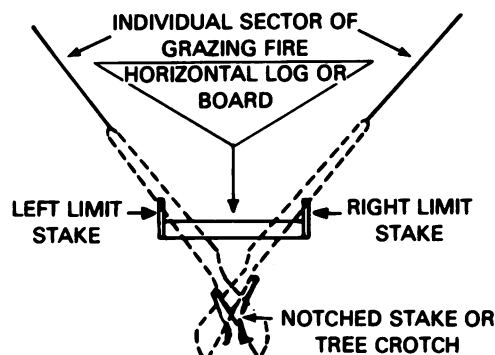
1. Can be placed in selected target areas/positions.
2. Are all within sector of fire (FPF or fires on sector limits must be grazing fire).

### PERFORMANCE MEASURES:

1. Physically locate and identify probable enemy positions and avenues of approach.
2. Prepare field expedient aiming, firing, and limiting stakes (notched stick or tree crotch, figure 1; rocks, board or log, figure 2) which are able to support the weight of your weapon.



*Figure 1.*



*Figure 2.*

3. Insure stakes, horizontal log, or board are well seated into the ground.
4. Place the weapon in the rests (notched stake, tree crotch, log, or board) and aim the M16A1 to hit the desired targets or cover a sector with grazing fire, and adjust the rests to hold the weapon in place.
5. To fire, hold the M16A1 in the rest with your right shoulder firmly against the weapon's butt plate.

**NOTE: The weapon must be held in the exact position in which it was held when it was sighted in.**

6. By using additional stakes or a horizontal board or log you can lay the weapon for grazing fire along more than one line or to cover an entire sector depending on the terrain (figure 1 and 2). Grazing fire is achieved when the cone of fire does not rise 1 meter above the ground.

**REFERENCE:**

**TEC Lesson 940-071-0089-F, Field Expedient Devices, M16 and M203**

**TASK NUMBER: 071-318-2201**

---

**PREPARE AN M72A2 LAW FOR FIRING; RESTORE  
M72A2 LAW TO CARRYING CONFIGURATION**

---

**CONDITIONS:**

Given an M72A2 LAW (NOTE: Expended LAW may be used).

**STANDARDS:**

1. Preparation for firing:
  - a. Within 30 seconds, conduct a visual prefiring safety inspection. Do not extend/fire damaged LAW.
  - b. Within 30 seconds, extend the launcher and lock in position, check backblast area, place launcher on the shoulder in firing position, and move the safety handle to ARM.
2. Restore to carrying configuration: Place on SAFE with the launcher tube collapsed, sights in down position, and sling assembly and pull pin replaced.

**PERFORMANCE MEASURES:**

1. To prepare the launcher for firing:
  - a. Inspect the M72A2 LAW to insure that all seals are intact and that the tube has not been cracked, punctured, or crushed. Check the pull pin and trigger safety handle to verify proper placement. Damaged LAWs should not be fired.

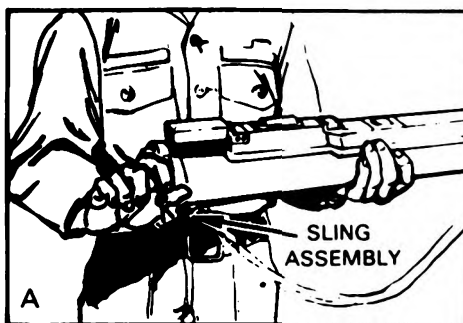
**WARNING:** Check data plate on launcher for words "with coupler." If words are not on data plate, do not attempt to fire the weapon.

- b. See figure 1. Remove the pull pin and rotate the rear cover downward (figure 1A), allowing the front cover and sling assembly to fall free. Do not discard the sling assembly until the rocket is fired.
  - c. Extend the launcher by grasping the rear sight cover and sharply pulling the launcher to the rear until locked into position (figure 1C). Attempt to collapse the launcher by reversing the motion of your hands to verify it is locked into position.
  - d. Place the weapon on the shoulder (figure 2A).
  - e. Check the backblast area (figure 2B). If soldiers are in the backblast

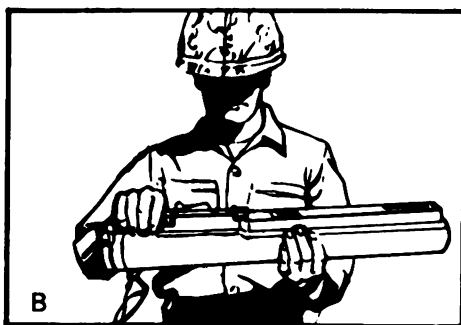
area, warn them and wait for them to get out of the area before arming the launcher.

f. Move the safety handle to ARM (figure 2B) once the backblast area is clear.

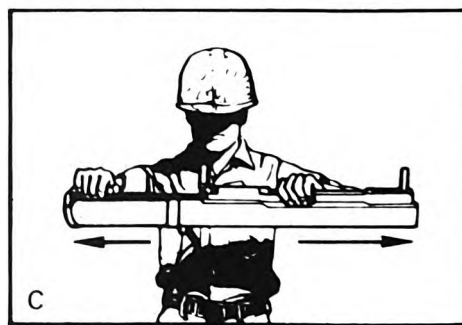
**CAUTION:** Once the weapon is placed on the shoulder, keep it pointed up and down range.



REMOVAL OF SLING ASSEMBLY



PREPARING TO EXTEND LAUNCHER

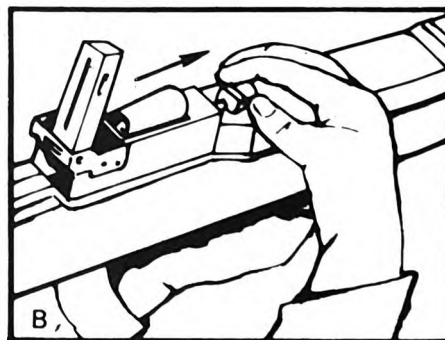


LAUNCHER EXTENDED

*Figure 1. Preparation/Extending Launcher.*



ARMING THE LAUNCHER  
PLACE LAUNCHER ON SHOULDER

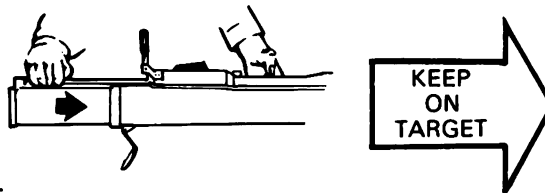


MOVING SAFETY TO "ARM" POSITION

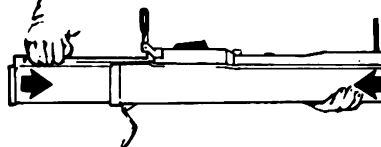
*Figure 2. Arming the Launcher.*

## 2. To restore to carrying configuration:

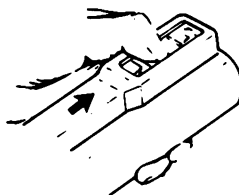
- a. Return trigger safety handle to SAFE.
- b. Grasp launcher by rear sight housing.
- c. Squeeze detent boot.



- d. Collapse launcher slightly.
- e. Move hand from detent boot to front sight.

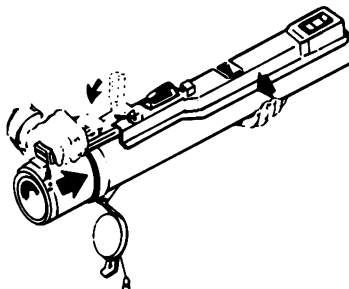


- f. Hold down front sight.
- g. Collapse launcher until inner tube covers tip of front sight.

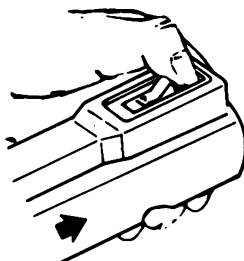


COMPLETE ALL COMPRESSION  
ACTIONS SLOWLY TO AVOID  
INJURY TO FINGERS

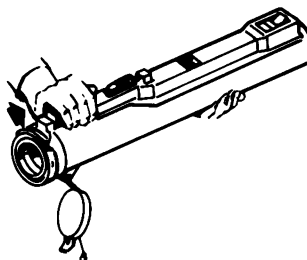
- h. Fold down rear sight and guide under housing.



- i. Compress launcher until travel is stopped by lip on front sight.
- j. Press front sight lip with thumb and slowly compress launcher over lip edge.

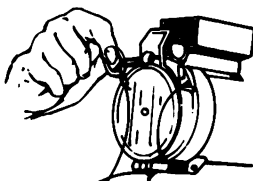


- k. Remove thumb from front sight and grasp housing.
- l. Close launcher fully.



- m. Close rear cover, insuring that the round lock fits through the slot in the cover.

- n. Replace cover pull pin. (NOTE: Cover pull pin should be inserted from right to left with the short end through the cover closing lug and the long end through the round lock which protrudes through the rear cover.)



REPLACE COVER  
PULL PIN

- o. Replace front cover and hold in place.
- p. Replace sling assembly. Grasp both web straps of the sling assembly next to the hook springs and place thumb on the rear cover above the hinge. Exert downward pressure with the thumb while pulling up on the sling assembly until the hooks snap into position over the cover hinge. (NOTE: Using the rear cover as a lever to assist in attaching the sling assembly will damage the cover hinge.)

## REFERENCES:

FM 23-33, 66-mm HEAT Rocket M72A1, M72A1E1, and M72, C1 & 2,  
Jul 70 (chap 2, pages 7, 8, and 9, para 11.a.(1) thru (3))  
TEC Lesson 948-071-0005-F, Operating the LAW, M72A2

**TASK NUMBER: 071-318-2202**

---

**ENGAGE TARGETS WITH AN M72A2 LAW**

---

**CONDITIONS:**

During daylight, on a suitable firing range, given an M190 subcaliber device and seven M73 rockets (three rounds for stationary target phase and four rounds for moving target phase), a series of stationary targets located between 75 and 200 meters from firer which will be presented in a combination of frontal, flank, or oblique views, and a moving [6 to 24 kmph (4 to 14 mph)] target presented in a flank view between 75 and 165 meters from the firer.

**STANDARDS:**

Firer will achieve:

1. Two target hits of three rockets fired at stationary targets.
2. Two target hits of four rockets fired at moving targets.

**PERFORMANCE MEASURES:****1. Sights.**

a. **Rear Sight.** The rear sight consists of a flip-up peepsight. The sight should be as close to the eye as possible and the front sight viewed through the peep when sighting (aiming).

b. **Front Sight (figure 1).** The front sight is a clear plastic flip-up leaf. On the sight there is a vertical range line with ranges from 50 to 350 meters indexed in 25-meter increments, two curved stadia lines (LAW stadia lines are not accurate and are no longer used) and lead crosses.

**2. Estimating Range.** The first step in target engagement is to determine the range to the target. This should be done using visual range estimation (see task: Estimate range) aided by the use of a range/sector card. A range/sector card is a rough drawing of the terrain in your defensive sector which shows easily recognized reference points (terrain features or objects) and the distance to each (paced off or measured when possible). If there are no usable reference points available, stakes can be erected at known ranges to serve the same purpose.

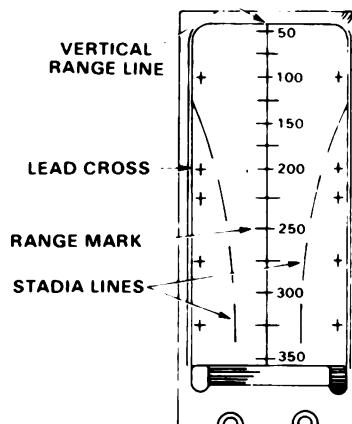


Figure 1. Front sight.

### 3. Sighting.

a. Stationary Targets. After determining the range, you sight on stationary targets by:

- (1) Locating the range mark on the vertical range line corresponding to the estimated range,
- (2) Placing that point on the center of target mass (figure 2), and
- (3) Fire.

**NOTE:** Consider all front/rear views as stationary targets, even if moving.

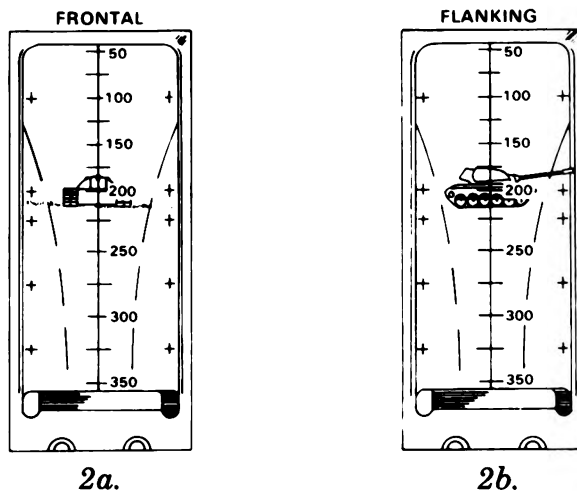


Figure 2. Stationary targets at an estimated range of 200 meters.

b. Moving Targets. After determining the range, you sight on moving targets by:

- (1) Estimating target speed as slow or fast (see table 1).



**ESTIMATE TARGET SPEED AS:****SLOW for:**

- a. Vehicles moving 5 mph (8 kmph) or less.
- b. All oblique targets where you see more of the front/rear than side.

**FAST for:**

All targets (except b above) traveling faster than 5 mph (8 kmph).

Table 1.

(2) Applying appropriate lead using lead cross directly opposite estimated range, and

- (a) For slow targets, lead cross should be on center of mass (figure 3).
- 3). The vertical range line should be in front of the target.

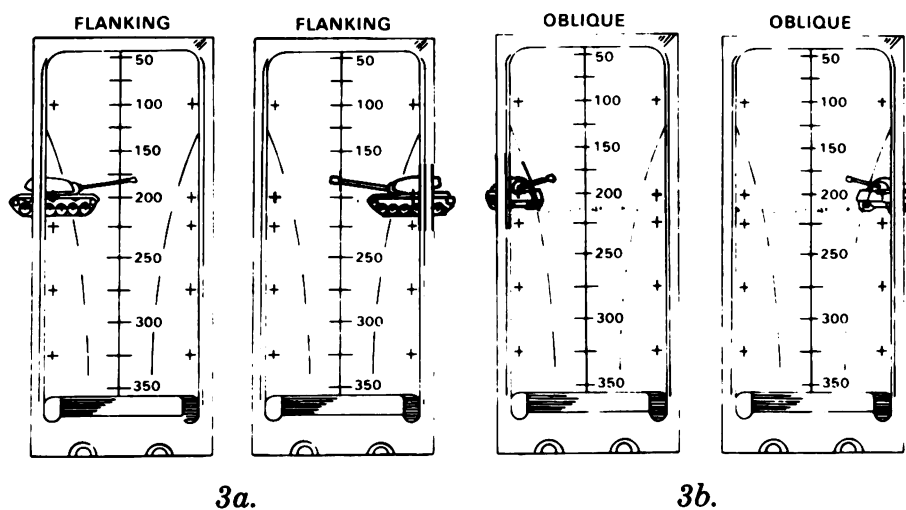
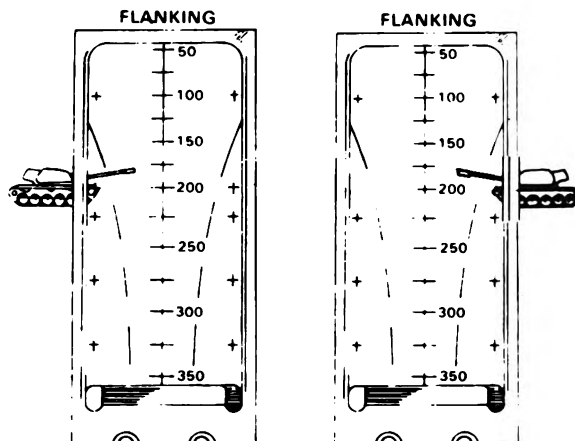


Figure 3. Slow targets at a range of 200 meters.

- (b) For fast targets, lead cross should be on front edge of target (figure 4). The vertical range line should be in front of the target.



*Figure 4. Fast target at a range of 200 meters.*

(3) Fire.

**NOTE:** If there is no lead cross at your estimated range, use an imaginary lead cross which aligns with those present on the sight.

**4. Trigger Squeeze.**

The trigger is unique in that it is a bar located on the top of the launcher. To fire, pressure must be applied straight down. The gunner should apply a steady, smooth squeeze downward with fingertips only.

**REFERENCE:**

**FM 23-22, 66-mm HEAT Rocket M72A1, M72A1E1 and M72, Jul 70**  
 (chap 2, page 6, para 8 and 9; chap 5, page 17 thru 22, para 25a, b, c(1)  
 - (4); chap 7, page 32, para 32)  
**TEC Lesson 948-071-0006-F, Engaging the Target (LAW)**

**TASK NUMBER: 071-318-2203**

---

**APPLY IMMEDIATE ACTION TO CORRECT A  
MALFUNCTION ON AN M72A2 LAW**

---

**CONDITIONS:**

During daylight or darkness, in a field location, given an M72A2 LAW; an attempt to fire the weapon having resulted in a misfire.

**STANDARDS:**

Within 3 minutes, apply immediate action and attempt to fire the LAW. If the weapon still fails to fire, dispose of the weapon in accordance with unit SOP.

**NOTE:** Time factors and safety precautions apply only to training.

**PERFORMANCE MEASURES:****1. Immediate action (training only).**

- a. Resqueeze the trigger bar. If round does not fire, shout "MISFIRE," wait 10 seconds.
- b. Place trigger safety handle on SAFE while keeping LAW trained on the target, then remove from shoulder.
- c. Wait 1 minute, depress detent and collapse launcher about 4 inches.
- d. Re-extend launcher and place it on shoulder.
- e. Check backblast area.
- f. Arm, aim, and attempt to fire.
- g. If LAW fails to fire after use of immediate action (training only).
  - (1) Keep LAW aimed at target for 10 seconds.
  - (2) Place LAW on SAFE and keep it aimed on target for 1 minute.
  - (3) DO NOT COLLAPSE LAUNCHER.
  - (4) Dispose of launcher as directed by unit SOP.

**2. Immediate action (combat only).**

- a. Immediately resqueeze the trigger bar if round does not fire.
- b. Return the arming handle to SAFE.
- c. Remove LAW from shoulder, collapse and re-extend (keeping hands clear of the front and rear tube openings).
- d. Replace the LAW on shoulder.
- e. Check the backblast area.
- f. Arm, aim, and attempt to fire.
- g. If the LAW still fails to fire, return to SAFE, remove from shoulder, collapse the tube (this keeps the firing mechanism from functioning) and discard.

**NOTE: DO NOT LEAVE an intact LAW on the battlefield. The enemy can and will use it against you.**

- h. If another LAW is available, try to engage the target if it is still in range or poses a threat to your unit.

**NOTE: If an M190 subcaliber device was used in training, an instructor or safety NCO should examine the primer housing lock pin to insure that the bent position of the lock pin is pushing against the primer housing door. This is to be done after the first 1-minute wait is completed. After the second failure to fire and its subsequent 1-minute wait, remove the M73 and examine the primer cap. If the primer cap is dented, a rocket malfunction has occurred, and if the primer cap is not dented, the launcher has malfunctioned.**

**REFERENCES:**

**FM 23-33, 66-mm HEAT Rocket M72A1, M72A1E1, and M72, Jul 70 (chap 2, pages 10 and 11, para 13)**  
**TEC Lesson 948-071-0005-F, Operating the M72A2 LAW**

**TASK NUMBER: 191-376-0105**

---

**MAINTAIN A CALIBER .45 PISTOL**

---

**CONDITIONS:**

Given one caliber .45 pistol; one magazine; cleaning compound, solvent (CR); volatile mineral spirits, paint thinner, or drycleaning solvent; clean rags; and lubricating oil, PL Special.

**STANDARDS:**

Within 20 minutes, you must clear, disassemble, clean, lubricate, and reassemble the pistol.

**PERFORMANCE MEASURES:****1. Clearing.**

- a. Hold the pistol in the raised pistol position.
- b. Depress the magazine catch and remove the magazine.
- c. Pull the slide to the rear and lock it in its rearward position by pushing up on the slide stop.
- d. Point the pistol toward the sky and look into the chamber to be certain it is clear.

**2. Disassembly (figure 1).****3. Care and Cleaning of the Caliber .45 Pistol.****a. Cleaning materials.**

(1) Cleaning compound, solvent (CR), is used to clean the bore and face of slide after firing. This cleanser has preservative properties and provides temporary protection against rust.

**CAUTION: CR solvent cleaning compound is usable at temperatures of -20°F and higher.**

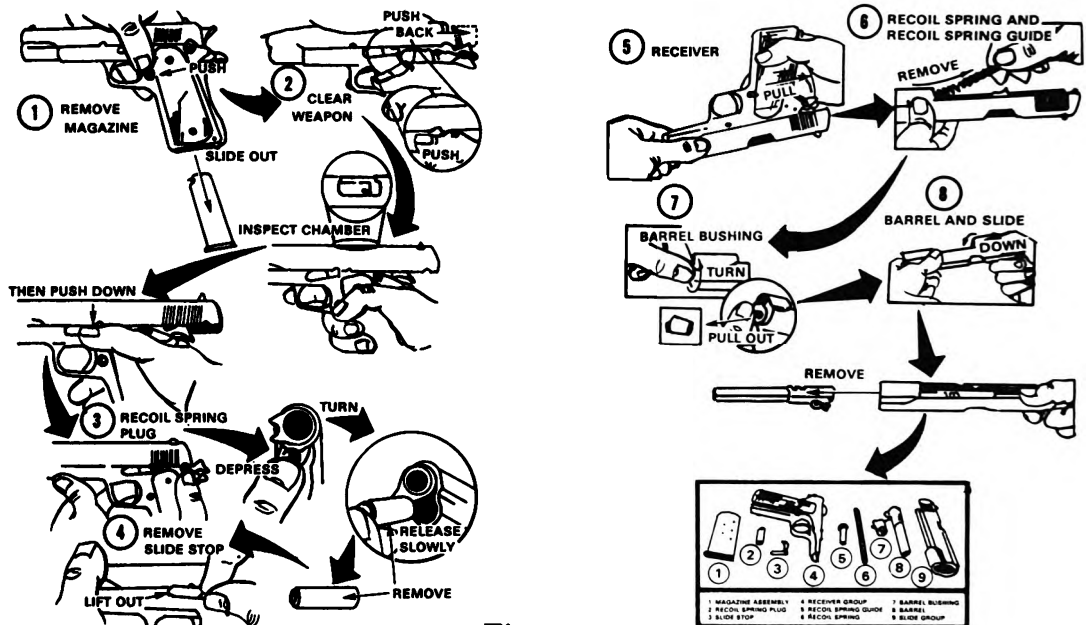


Figure 1.

(2) Hot soapy water may be used to clean the bore when CR is not available. After using the solution, dry barrel thoroughly and apply a light coat of oil.

(3) Volatile mineral spirits, paint thinner, and drycleaning solvent are noncorrosive solvents used for removing oil, grease, or light rust-preventive compounds from weapons. Apply these cleaning agents with a rag to large parts and use them as a bath for small parts.

(4) Cotton wiping rags should be soft and absorbent and free of dust, alkali, or corrosive agents.

#### b. Lubricants.

(1) Lubricating oil, general purpose, PL Special, is a thin oil used for lubricating above 0°F and for providing temporary protection against rust.

(2) Engine oil, SAE 10, may be used when lubricating and preservative oil cannot be obtained. When engine oil is used, the weapon must be inspected, cleaned, and oiled frequently.

(3) LAW weapons lubricating oil is to be used at temperatures below 0°F.

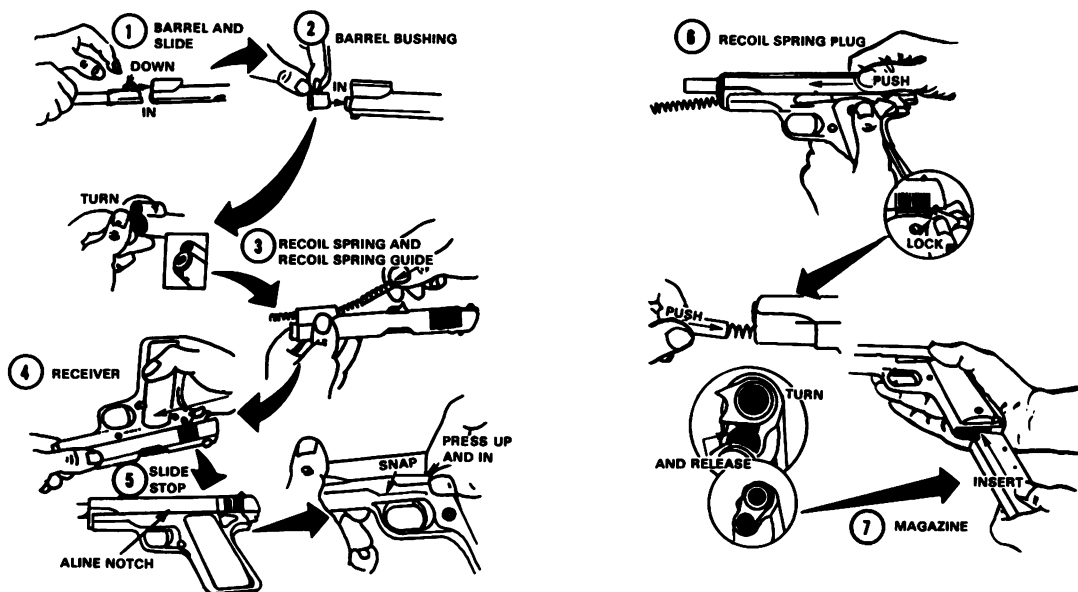
### 4. Care and Cleaning of Caliber .45 Ammunition.

a. Protect ammunition from mud, sand, dirt, and water. If it appears wet or dirty, wipe clean with a dry cloth immediately. Wipe off light corrosion as soon as it is discovered. Cartridges with heavy coat of corrosion must be turned in to the ammunition supply point.

b. Do not oil or polish cartridges. Do not attempt to fire cartridges that have dents, scratches, loose bullets, or corroded cases. If a cartridge is defective, turn it in to the ammunition supply point.

c. Ammunition should be stored in an airtight box away from all sources of extreme heat. Do not open ammunition boxes until the ammunition is to be used.

5. **Assembly** (figure 2). When testing the caliber .45 pistol for correct assembly depress the safety lock, pull the slide fully to the rear, and release it by pushing down on the slide stop. The hammer should remain cocked.



*Figure 2.*

## REFERENCES:

FM 23-35, Pistols and Revolvers, Sep 71 (chap 3, page 35 thru 37, para 25 thru 32; chap 4, page 38, para 35, 37, 38)





**TASK NUMBER: 191-376-0104****ENGAGE TARGETS WITH A CALIBER .45 PISTOL****CONDITIONS:**

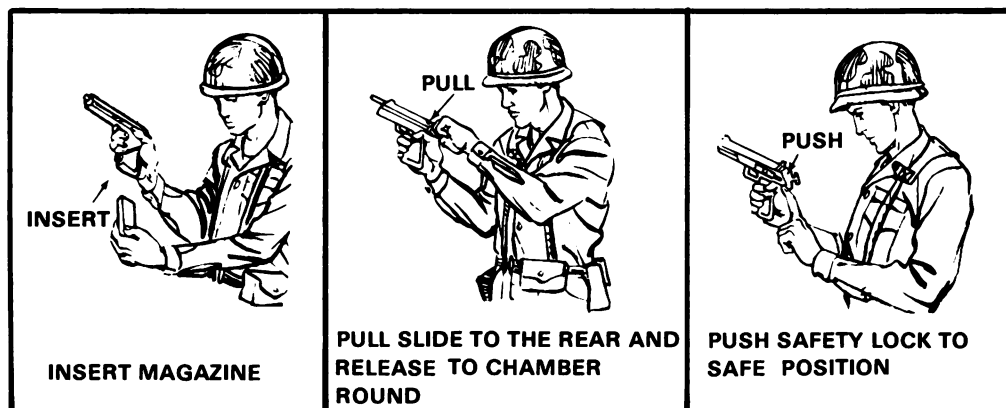
During daylight, on a combat pistol qualification course (CPQC), given a caliber .45 pistol, 40 rounds of ammunition loaded in eight magazines, two dummy rounds loaded arbitrarily in two magazines, and a requirement to fire tables 1 - 5 for qualification.

**STANDARDS:**

1. You must load the pistol, in sequence, IAW performance measure 1.
2. You must clear the pistol, in sequence, IAW performance measure 2.
3. Achieve a minimum score of 160 out of 300.
4. When a stoppage occurs, you must eliminate it by applying immediate action within 15 seconds.

**PERFORMANCE MEASURES:**

1. **Loading** (figure 1).
  - a. Hold the pistol in the raised pistol position.
  - b. Insert the magazine into the pistol.
  - c. Pull the slide to the rear and release to chamber a round.
  - d. Push the safety lock to the SAFE position.



*Figure 1.*  
2-III-C-2.1

## 2. Fundamentals of Quick Fire.

a. Grip. For quick fire without use of the sights, the pistol must act as an extension of your arm. To grip the pistol:

- (1) Hold pistol in nonfiring hand as shown in figure 2 and form a "V" with thumb and forefinger of shooting hand.
- (2) Place pistol in "V" with sights in line with the firing arm.
- (3) Wrap lower three fingers around grip, putting equal pressure with all three fingers straight to the rear.
- (4) Place thumb high alongside pistol without applying any pressure with it.
- (5) Place trigger finger on trigger so that it can be pulled straight to the rear.
- (6) Grip pistol tightly until hand begins to tremble and relax to the point that trembling stops.
- (7) If any of the three fingers on the grip are relaxed, the entire grip must be reapplied.

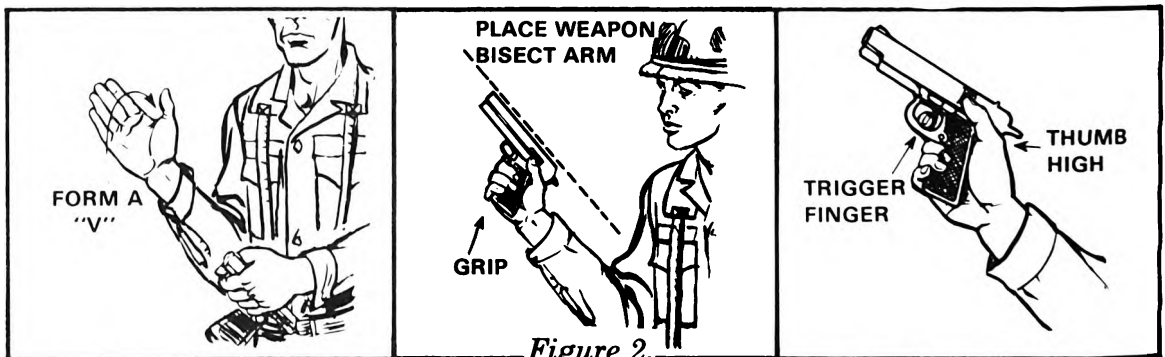


Figure 2.

b. Stance. From a ready position with the feet a comfortable distance apart (figure 3A), bend the knees slightly and thrust the shooting arm forward (figure 3B).

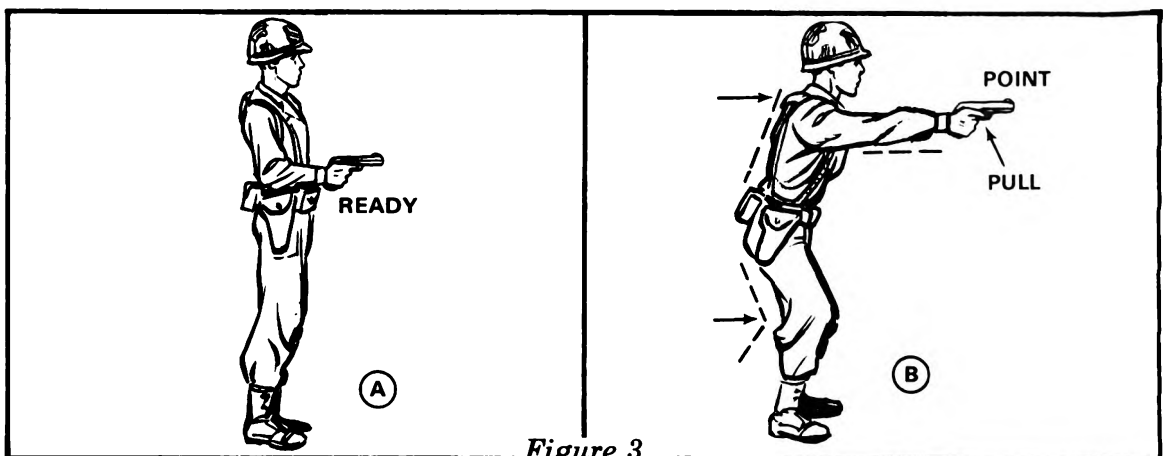


Figure 3.

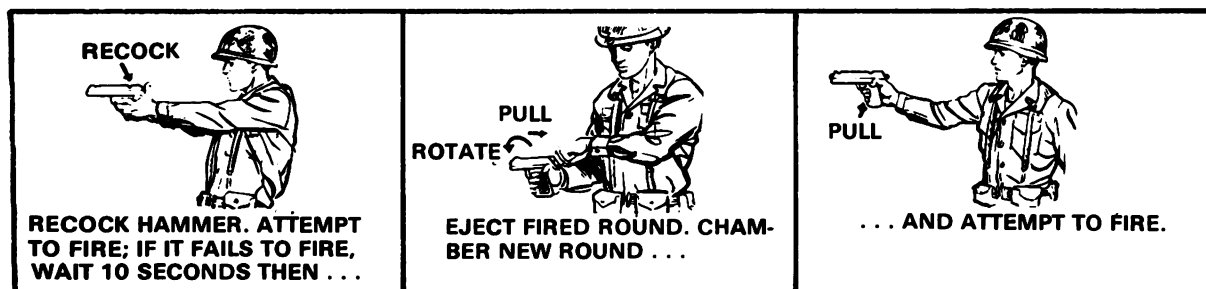
### 3. Engaging the Target.

- a. Look at the center of the target.
- b. Straighten the arm and lock the elbow.
- c. Without using sights, point at the center of the target as you would if pointing your finger.
- d. As soon as you point the pistol, apply pressure to the trigger evenly and firmly until weapon fires. **DO NOT USE SIGHTS.**

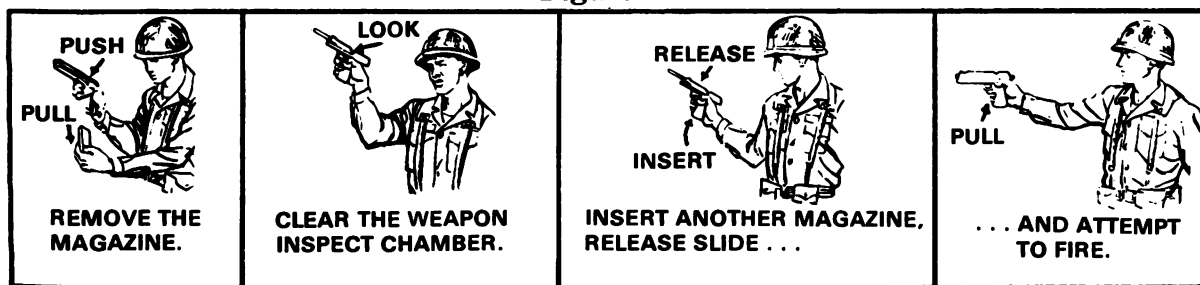
### 4. Immediate action to reduce a stoppage (figures 4 and 5).

- a. In the event the slide is fully forward, the hammer falls, and pistol fails to fire, apply immediate action as follows:

- (1) Recock weapon.
- (2) Attempt to fire.
- (3) 10-second pause (if weapon did not fire).
- (4) Eject round and chamber new round.
- (5) Attempt to fire again.



*Figure 4.*



*Figure 5.*

- b. In the event the slide is not fully forward, remove finger from the trigger guard and with the nonfiring hand attempt to push the slide fully forward. If the slide will not move forward, proceed as follows:

- (1) Remove magazine.
- (2) Inspect chamber.
- (3) Insert new magazine and release slide.
- (4) Attempt to fire again.

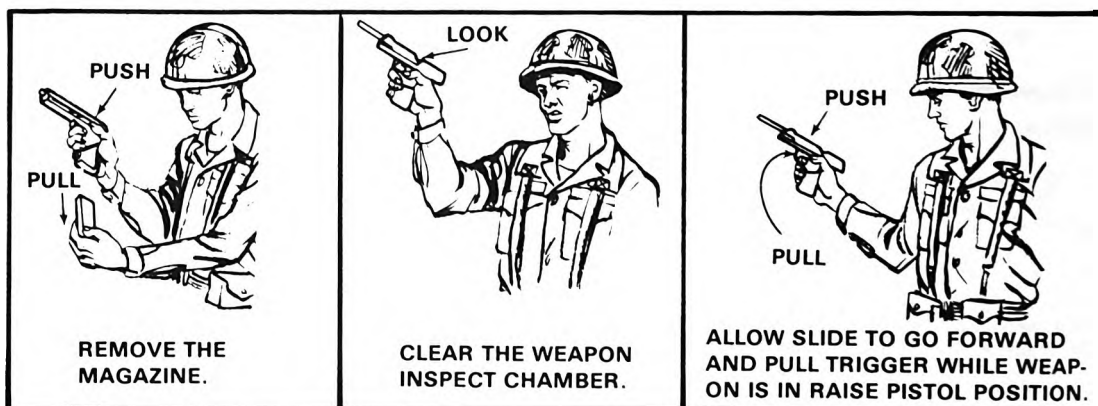
c. If the weapon does not fire after application of immediate action, as outlined above, make a detailed inspection to determine the cause of the stoppage.

**5. Unloading (figure 6).**

- a. Hold the pistol in the raised pistol position.
- b. Depress the magazine catch and remove the magazine from the pistol.
- c. Point the pistol toward the sky and look into the chamber to be certain it is clear.

**NOTE: Slide stays to the rear when the last cartridge in the magazine has been fired.**

- d. Allow the slide to go forward.
- e. Pull the trigger while pistol is in the raised pistol position.



*Figure 6.*

**6. Clearing.**

- a. Hold the pistol in the raised pistol position.
- b. Depress the magazine catch and remove the magazine.
- c. Pull the slide to the rear and lock it in its rearward position by pushing up on the slide stop.
- d. Point the pistol toward the sky and look into the chamber to be certain it is clear.

**REFERENCES:**

**FM 23-35, Pistols and Revolvers, Sep 71 (chap 2, pages 32 thru 34; chap 5, pages 40 thru 52)**

**TASK NUMBER: 071-313-3451**

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**PERFORM OPERATOR MAINTENANCE ON A  
CALIBER .50 M2 HB MACHINEGUN AND AMMUNITION**

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**CONDITIONS:**

During daylight, given a caliber .50 M2 HB machinegun with all components, cleaning kit, rags, rifle bore cleaner and special preservative lubricating oil.

**STANDARDS:**

1. Within 50 minutes, perform general disassembly, inspect, clean, and lubricate the caliber .50 M2 HB machinegun and M3 tripod mount IAW the performance measures below.
2. Assemble the gun and conduct a function check IAW the performance measures below.

**PERFORMANCE MEASURES:**

Disassembly, cleaning, inspection, lubricating, and assembly should be conducted in the following manner:

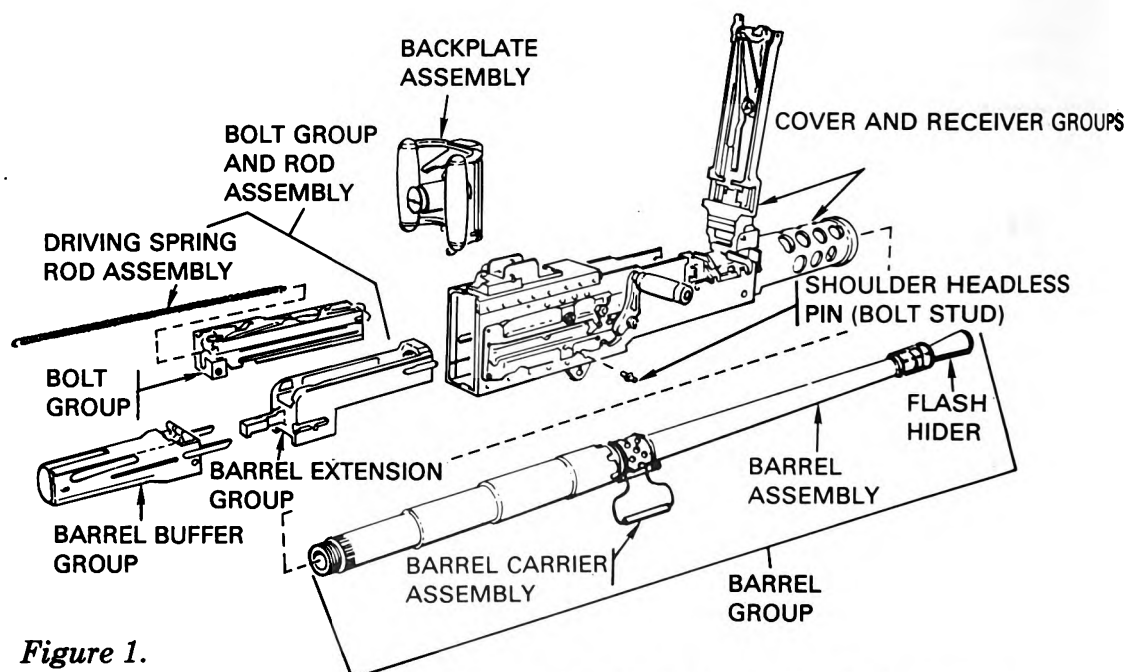
1. **Disassembly** (figure 1).

- a. **Clearing the Gun.** Before disassembly, clear the gun as follows:

- (1) Unlock bolt latch release and raise the cover (if applicable).
    - (2) Pull the bolt to the rear and examine the chamber and T-slot to insure they hold no rounds.

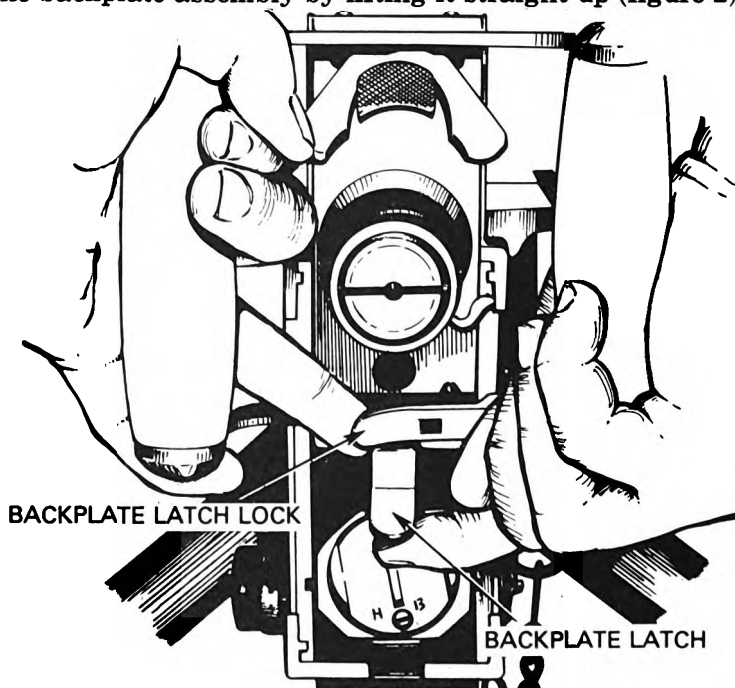
**NOTE:** In darkness, the gunner must feel the chamber and T-slot.

- b. **Barrel Group.** Turn the cover latch shaft lever and raise the cover group. Grasp the retracting slide handle with the left hand, palm down; push the recoiling parts to the rear until the outer lug on the barrel locking spring aligns with the  $\frac{3}{8}$ -inch hole in the right sideplate of the receiver. The barrel can be turned only when the locking lug is aligned with the  $\frac{3}{8}$ -inch hole. Be careful not to damage the threads or barrel locking notches. Unscrew the barrel and place it on the ground. Allow the bolt to go forward slowly. Take care to prevent the bolt group from slamming forward with the barrel removed.



*Figure 1.*

c. **Backplate Assembly.** To remove the backplate assembly, insure that the bolt latch release is up. If it is not, push down on the bolt latch release and turn the buffer tube sleeve clockwise until the bolt latch releases. The bolt must be forward before the backplate assembly is removed. If the bolt is to the rear, push down on the bolt latch release and let the bolt ride forward by holding the retracting slide handle. The backplate latch and the latch lock are below the buffer tube. Pull out on the latch lock and up on the latch; remove the backplate assembly by lifting it straight up (figure 2).



*Figure 2.*

d. **Driving Spring Rod Assembly.** The inner and outer driving springs and the driving spring rod are located next to the right sideplate, inside the receiver. Push in and to the left on the head of the driving spring rod. Pull the driving spring rod assembly to the rear and out of the receiver. A slight pressure is exerted on the driving spring when the bolt is forward; however, never attempt to cock the gun while the backplate is off and the driving spring assembly is in place. If the backplate is off and the driving spring assembly is compressed, the retaining pin on the driving spring rod can slip from its seat in the right sideplate and injure anyone behind the gun.

e. **Shoulder Headless Pin (Bolt-Stud).** Grasp the retracting slide handle and give it a quick jerk, halfway to the rear, to free the bolt from the barrel extension and move the bolt halfway to the rear. Aline the collar of the bolt stud with the clearance hole in the bolt slot in the right sideplate and remove the bolt stud to the right. If the bolt is accidentally moved all the way to the rear, the bolt latch will engage in the bolt latch notches in the top of the bolt. If this occurs, raise the bolt latch and push the bolt forward to aline the bolt stud with the clearance hole (figure 3).

f. **Bolt Group.** After freeing the bolt, slide it from the rear of the receiver. Place the bolt down on its side (with the extractor arm up).

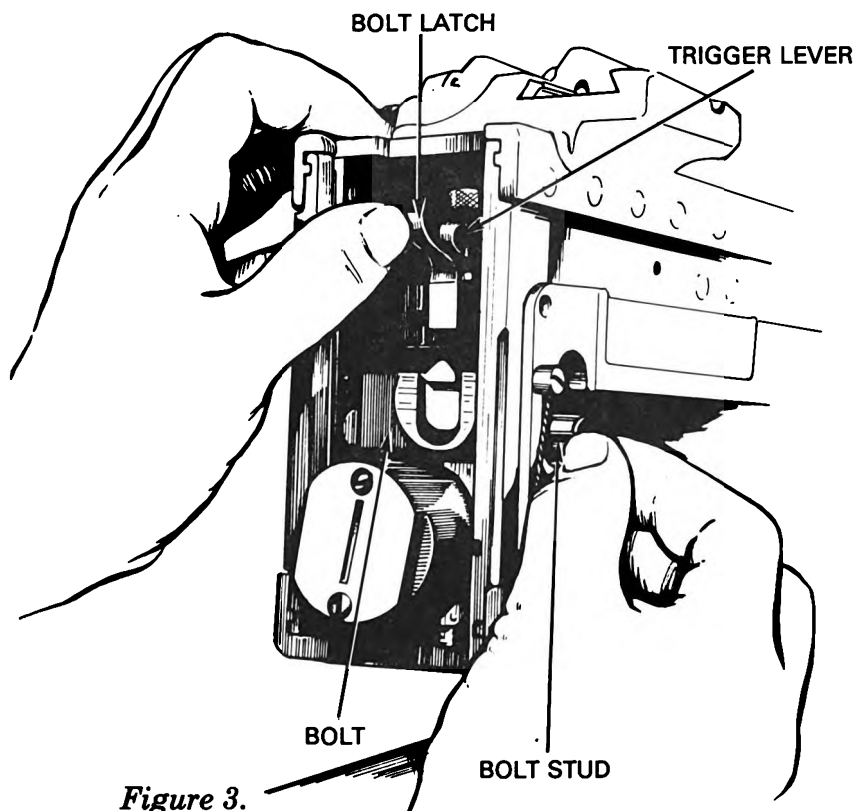
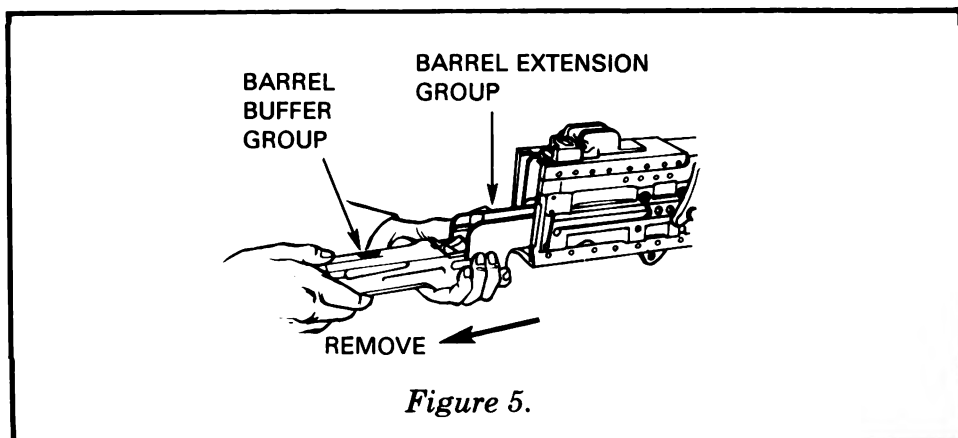
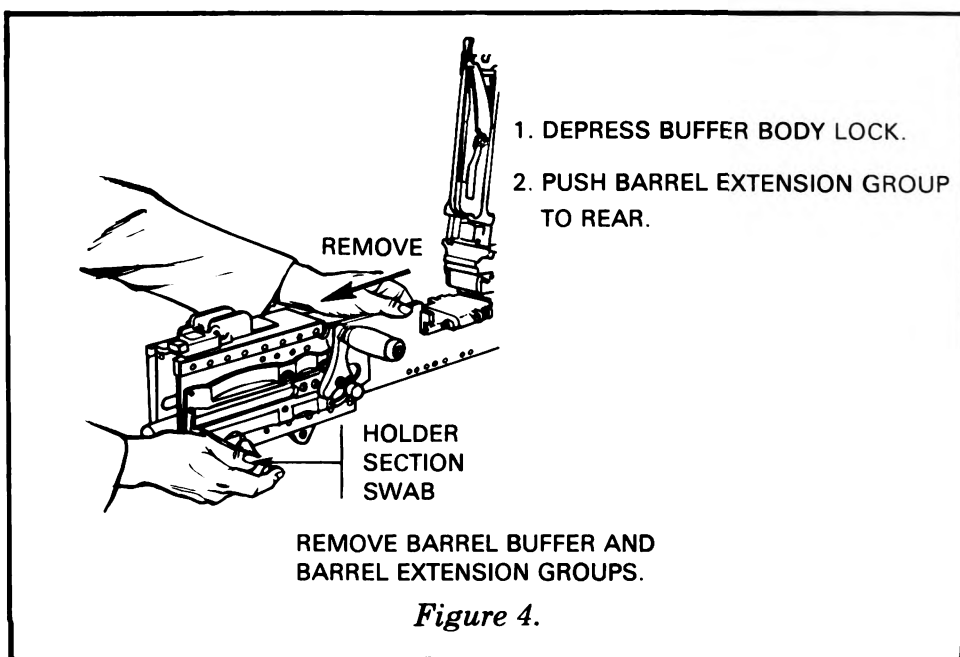


Figure 3.

g. Barrel Extension Group and Barrel Extension Group (figure 4). To remove the barrel buffer group and barrel extension group, insert a pointed instrument through the hole in the lower left corner of the right sideplate. Push in on the barrel buffer body spring lock. At the same time, place one hand inside the receiver and push the barrel extension group and buffer group to the rear. Remove the barrel group to the rear. Remove the barrel buffer group and barrel extension group from the receiver. Separate the two groups by pushing forward on the accelerator tips.

h. Barrel Buffer Assembly (figure 5). Pull the barrel buffer assembly from the rear of the buffer body group. The buffer assembly will not be disassembled. This completes general disassembly for limited cleaning and replacement of groups.





**2. Maintenance and Inspection.** Care, cleaning, and maintenance determine whether or not the gun will function properly when needed. The bore and chamber must be properly maintained to preserve accuracy. Because of the close fit of working surfaces and the high speed at which the gun operates, the receiver and moving parts must be kept clean, correctly lubricated, and free from burrs, rust, dirt, and grease to insure proper, efficient functioning.

a. **Mount Maintenance.** The care, cleaning, lubrication, and adjustment of the mount used with the gun are no less important. The functioning of the gun and mount together determine overall effectiveness. All accessories and equipment used with the gun and mount, including ammunition, must be properly maintained.

b. **Maintenance System.** To insure proper care of the machinegun, it is necessary to have a system of maintenance or a standing operating procedure (SOP) for the frequency of cleaning. Each gun should be cleaned as soon after firing as possible and each time it is exposed to field conditions. Under combat conditions, the gun should be cleaned and oiled daily. Under extreme climatic and combat conditions, it may be necessary to clean and lubricate more frequently. Under ideal conditions, where the gun is not used and is stored in a clean, dry place, it may only be necessary to inspect, clean, and lubricate every 5 days. The gun should be disassembled, cleaned, and oiled in a clean, dry location, where it is least exposed to moisture, dirt, etc. Maintenance and preparation for storage over a longer period of time is covered in ordnance regulations (Ord 3SNL A-1). If possible, keep the gun covered with a gun cover, canvas, tarpaulin, or poncho when not in use.

### **3. Cleaning Materials.**

a. Rifle bore cleaner is used to clean the bore of the machinegun barrel after firing. Immediately after using bore cleaner, dry the bore and any parts of the gun exposed to the bore cleaner; then apply a thin coat of special preservative lubricating oil.

b. When bore cleaner is not available, hot or cold water can be used; however, warm, or hot, soapy water is recommended. After using soap and water, dry the barrel and apply a thin coat of special preservative lubricating oil.

### **4. Lubricating.**

a. Special preservative lubricating oil (PL) is a thin oil used for lubricating at normal and low temperatures and for providing temporary protection against rust. The entire gun can be lubricated with this oil.

b. Lubricating oil (LSA) should be used to lubricate all friction-producing parts of the gun as well as exterior parts exposed to the elements. LSA will not burn off during firing or wash off during rain.

c. In cold climates (consistently below 0°F), lubricate the gun with lubricating oil, arctic weather (LAW) and keep it covered as much as possible. For further information, see TM 9-207 and FM 31-70.

d. In hot, humid climates, inspect the gun frequently for signs of rust. Keep the gun free of moisture and lightly oiled with lubricating oil (LSA).

## **5. Care and Cleaning Before, During, and After Firing.**

a. Before firing (when the situation permits), take the following steps to insure efficient functioning of the machinegun:

(1) Disassemble the gun into its major groups or assemblies.

(2) Clean the bore and chamber, but do not oil them.

(3) Clean all metals parts thoroughly and apply a light coat of oil to all metal parts which do not come in contact with the ammunition.

b. To insure complete removal of powder residue and primer fouling from the bore of the machinegun barrel, the bore should be cleaned once each day, for at least three consecutive days after firing. The bore sweats out this fouling or residue, and cleaning must be repeated until there is no further evidence of sweating.

**6. Care and Cleaning Under Unusual Climatic Conditions.** Extreme cold, hot, dry, and tropical climates affect the gun and its functioning. Care should be taken under these climatic conditions to insure that the gun is cleaned daily with the prescribed lubricants and protected from the elements by some sort of cover if possible. Further information on care and cleaning of the gun under unusual climatic conditions can be found in TM 9-1005-213-10.

**7. Assembly.** To assemble the machinegun, replace the groups and assemblies in reverse order of disassembly.

**8. Ammunition.** Ammunition should be clean and dry. One belt of ammunition should remain attached to the weapon, and all other ammunition remain in the can until needed.

## **REFERENCES:**

FM 23-65, Browning Machinegun, Caliber .50 HB, M2, May 72 (chap 2, page 4)

FM 31-70, Basic Cold Weather Manual, C1, Apr 68 (chap 6, page 123)

TM 9-1005-213-10, Operator's Manual: Machinegun, Caliber .50 Browning, M2, C2, Jul 68 (chap 3, pages 48 and 58)

TEC Lesson 941-071-0116-F, Caliber .50 Machinegun, Mechanical Training

**TASK NUMBER: 071-313-3452**

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**TARGET/ZERO A CALIBER .50 MACHINEGUN**

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**CONDITIONS:**

During daylight, on a live fire range, given an M3 tripod-mounted caliber .50 HB, M2, machinegun, a target between 400 and 1,000 meters from the firing position, and a 15-round belt of tracer ammunition.

**STANDARDS:**

Firing single rounds, using the 15 rounds provided, adjust the windage and elevation until a round hits the target.

**PERFORMANCE MEASURES:**

1. During targeting/zeroing, select a target 400-1,000 meters from the gun position.
2. Place the selected range on the rear sight and aline the windage index (windage zero).
3. Place the gun on single shot.
4. Lay gun on target using the traversing and elevating (T&E) mechanism.
5. Fire a single round at the target and note where the round hits.
6. Making necessary corrections while looking through the rear sight, move the rear sight (windage and elevation) so that the front sight blade is alined with the point of impact of the round.
7. Re-lay on the target using the T&E mechanism.
8. Fire a confirming round. If the adjustments were correct, the round will hit the target.
9. If the confirming round does not hit the target, repeat the same procedures until targeting is completed or until the 15-round belt has been expended.

**REFERENCES:**

FM 23-65, Browning Machinegun, Caliber .50 HB, M2, May 72 (chap 9, para 134, page 163)  
TEC Lesson 941-071-0118-F, Caliber .50 Machinegun Field Zeroing



**TASK NUMBER: 071-313-3453**

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**LOAD, REDUCE A STOPPAGE, UNLOAD, AND CLEAR  
A CALIBER .50 MACHINEGUN**

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**CONDITIONS:**

Given an assembled and cleared caliber .50 machinegun with headspace and time correctly set, a belt of linked caliber .50 ammunition, and a requirement to expend all rounds in the belt. (A dummy round may be inserted in the belt for training purposes.)

**STANDARDS:**

1. Situation 1: Load and fire the gun within 10 seconds.
2. Situation 2: When a stoppage occurs, it must be eliminated by using immediate action and the next round fired within 10 seconds (but only if round is ejected). Then fire all remaining rounds.
3. Situation 3: Unload and clear gun within 10 seconds.

**PERFORMANCE MEASURES:****1. Loading.**

- a. Insure bolt is forward and cover closed.
- b. Insert double-loop end of belt in feedway until the first round is engaged by belt-holding pawl.
- c. Jerk retracting slide handle to the rear and release it. (If bolt latch release is up, return retracting slide handle to forward position and then release bolt.) The gun is now "half-loaded".
- d. To complete loading, jerk retracting slide handle to the rear a second time and release it. When bolt goes forward for the second time, the gun is loaded.

**2. Firing (single shot and automatic).**

- a. Single shot - keep bolt latch release in the up position and release it manually for each round, then push trigger.

- b. Automatic - lock bolt latch release down with bolt latch release lock.

**CAUTION:**

**Never close cover with bolt to the rear.**

**Never allow bolt to go forward freely with the barrel out of the gun.**

**Ease it forward with retracting slide handle.**

**3. Unloading and clearing.**

**a. Cold Gun.**

- (1) Unlock bolt latch release (if applicable) and raise cover.
- (2) Lift the extractor from the ammunition belt.
- (3) Lift ammunition belt from feedway.
- (4) Pull bolt to rear.
- (5) Insure T-slot and chamber hold no rounds.

**b. Hot Gun.**

- (1) Place gun in the single shot mode.
- (2) Fire round in chamber.
- (3) Open cover; remove ammunition belt.
- (4) Press down on bolt latch release allowing bolt to go forward and chamber round in T-slot.
- (5) Close cover and either fire or eject round in chamber.

**4. Immediate action.** Immediate action is the action taken to reduce a stoppage without investigating the cause. This action must be accomplished within 10 seconds when the barrel is hot enough to cause a cookoff. Two hundred rounds fired in a 2-minute period may heat the barrel sufficiently to cause a cookoff.

a. If a stoppage occurs, immediately pull the retracting slide handle to the rear and release it; observe if the round is ejected.

b. If a round is ejected, press the trigger and attempt to fire. If the gun does not fire and the barrel is hot enough to cause a cookoff, wait 5 minutes with the bolt in the forward position to preclude damage or injury in the event of a cookoff.

c. If a round is not ejected, or after the 5-minute waiting period, clear the gun and perform remedial action -- inspect the weapon and the ammunition to determine the cause of the stoppage.

d. After performing remedial action, reload, re-lay on the target, and attempt to fire.

## **REFERENCES:**

**FM 23-65, Browning Machinegun, Caliber .50, HB, M2, May 72 (page 10, para 36)**

**TM 9-1005-213-10, Operator's Manual: Machinegun, Caliber .50, Browning, M2, Jul 68 (page 42, para 2-8)**

**TEC Lesson 941-071-0116-F, The Caliber .50 machinegun: Mechanical Training**

**TEC Lesson 941-071-0119-F, Caliber .50 Machinegun, Firing**





## TASK NUMBER: 071-313-3454

## ENGAGE TARGETS WITH A CALIBER .50 MACHINEGUN

**CONDITIONS:**

During daylight, on a live-fire range, given a cupola-mounted caliber .50 machinegun, one belt of 200 rounds of caliber .50 (4 x 1) ammunition, three stationary targets (one linear, one linear with depth, and one deep target) and/or a moving target, and a requirement to engage all targets (approximately 50 rounds per target).

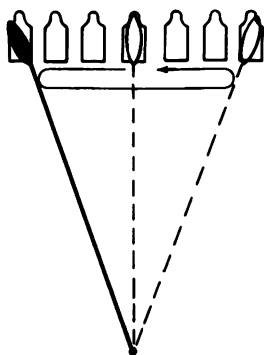
**STANDARDS:**

Engage all targets IAW the performance measures below firing 8- to 10-round bursts.

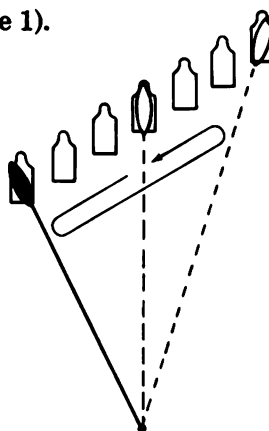
**PERFORMANCE MEASURES:**

**1. Sighting and Aiming.** When firing from the cupola mount, do not use the sights. Look over the top of the weapon and adjust fire to the target by the strike of the bullets on the ground, or by the tracer path.

**a. Linear Targets.** The gunner must engage the entire width of the target. He lays his gun on the center of mass, or portion of the target which presents the greatest threat. The gunner traverses his fire to either flank, then covers the remainder of the target (figure 1).



*Figure 1.*

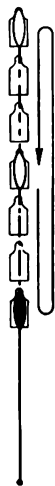


*Figure 2.*

**b. Linear Target with Depth.** The gunner must engage the entire width and depth of the target. He lays his gun on the center of mass, or portion of the target which presents the greatest threat. The gunner traverses and searches to the flank closest to his position, then covers the entire target (figure 2).

c. **Deep Targets.** The gunner must engage the entire target depth. The gunner lays on the center of mass, or portion of the target which presents the greatest threat. The gunner searches to the portion of the target nearest his position, then the entire target (figure 3).

d. **Moving Targets.** The gunner must apply correct lead on a moving target. He places his point of aim far enough in front of the target so that his fire and the target meet. (This distance is measured in target lengths. A vehicle at a range of 55 meters moving at 15 mph is given a lead of 1 target length (figure 4).)



*Figure 3.*



*Figure 4.*

## **2. Observation and Adjustment of Fire.**

a. **Observation.** The gunner observes either the dust raised by the strike of the round, or the tracers, and makes adjustment to bring his fire onto the target.

b. **Adjustment.** When the gunner observes the strike of the rounds, or tracers going high over the target, he immediately ceases fire and starts over again.

**3. Cupola (Free Gun) Firing.** The gunner grasps both spade grips firmly, locks both elbows to his sides, and presses his chest against the spade grips to steady the weapon. He keeps this position to fire each burst, using no sights.

## **REFERENCES:**

**FM 23-65, Browning Machinegun Caliber .50 HB, M2, May 72 (page 134)**

**TEC Lesson 941-071-0115-F, The Caliber .50 Machinegun: Mounting**

**TEC Lesson 941-071-0119-F, The Caliber .50 Machinegun: Firing**

**TEC Lesson 941-071-0125-F, Machinegun Target Engagement, Introduction**

**TASK NUMBER: 071-313-3455**

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**SET HEADSPACE AND TIMING ON A  
CALIBER .50 MACHINEGUN**

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**CONDITIONS:**

Given an assembled caliber .50 machinegun (track or tripod mounted) with incorrect headspace and timing, and a headspace and timing gage.

**STANDARDS:**

Within 10 minutes, the following conditions must be obtained once the gun is cocked and the bolt is forward:

1. **Headspace** - With the retracting slide handle pulled back 1/16-inch (so that the barrel extension is not resting against the trunnion block), the GO end of the headspace gage will enter the T-slot and the NO GO end will not (figure 1).

2. **Timing** - With the NO FIRE timing gage inserted between the barrel extension and the trunnion block (with the beveled edge of the gage on the barrel notches), the firing pin will not release when the trigger is depressed. When the NO FIRE timing gage is replaced by the FIRE gage, the firing pin will release when the trigger is depressed (figure 2).

**PERFORMANCE MEASURES:**

1. **Headspace Adjustment with the Gage** (figure 1).

a. Raise the cover. Retract the recoiling parts and screw the barrel all the way into the barrel extension, then loosen the barrel a measure of two notches or clicks.

b. Pull the retracting slide handle to its rearmost position. Hold the handle to the rear and press the bolt latch release, allowing the bolt to go forward slowly to prevent damage of parts.

**NOTE:** Be careful not to depress the trigger, since this will cause the firing pin to be released.

The firing pin should never be released with the gage in the T-slot as this could damage the firing pin and gage.

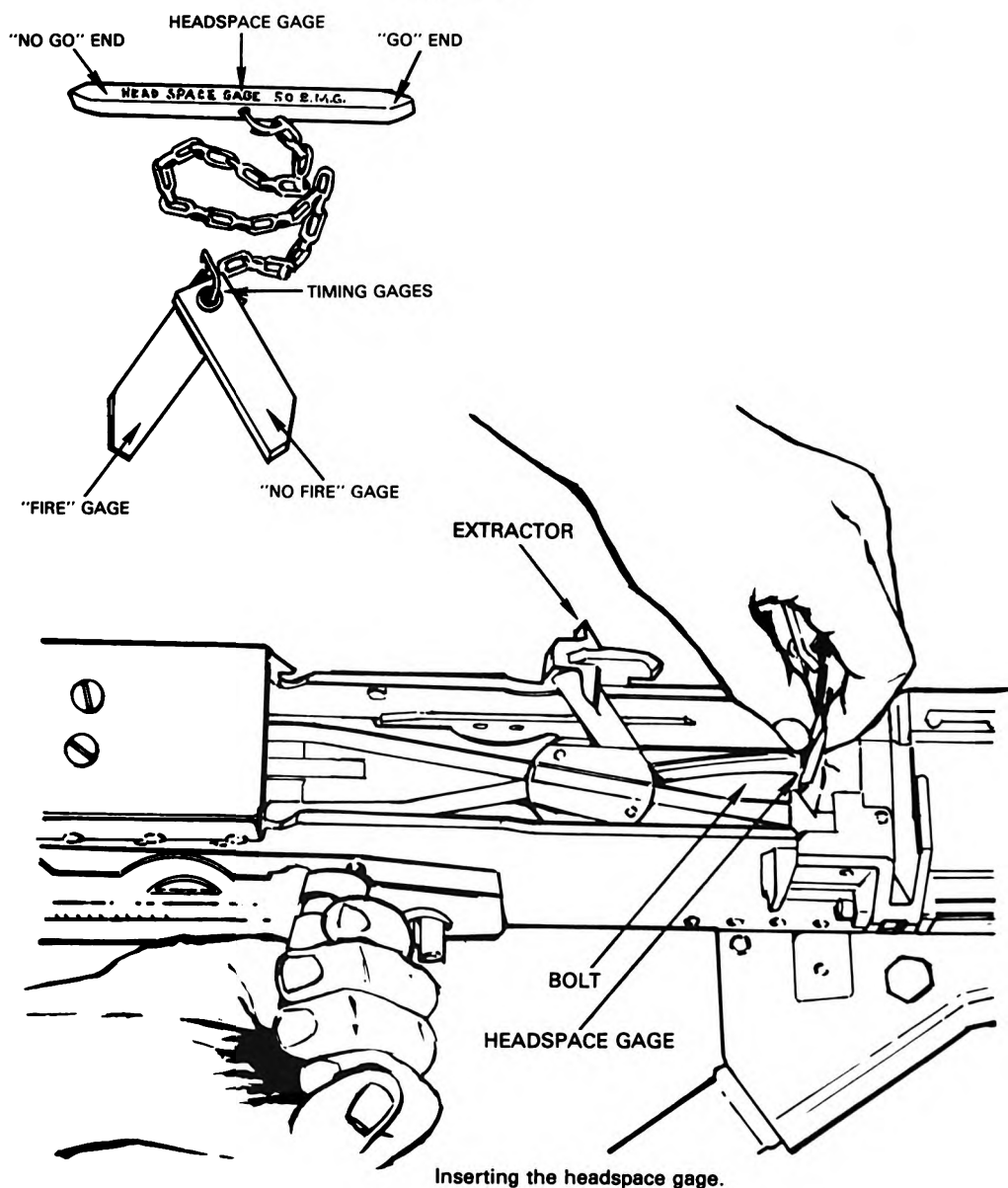
c. Pull the retracting slide handle back until the barrel extension is 1/16-inch from the trunnion block.

d. Insert the GO end and the NO GO end of the headspace gage in the T-slot. If the GO end of the gage enters freely down to the center ring on the gage and the NO GO end does not enter, headspace is correct.

e. If the GO end of the gage does not enter freely, the barrel must be unscrewed one notch (or click) at a time (check with the gage after each notch), until the GO end of the gage enters freely. To complete the adjustment, try to insert the NO GO end of the gage. If it does not enter, headspace is correct.

f. If the NO GO end of the gage enters the T-slot, headspace is too loose. The barrel must be screwed into the barrel extension (one click at a time), checking with the gage after each click, until the GO end enters and the NO GO end does not.

*Figure 1.*



## 2. To Set the Timing

a. After headspace has been set, insure the gun is cocked and all moving parts are fully forward. Then pull back on the retracting slide handle with the right hand palm up, making a large enough separation between the trunnion block and the barrel extension to insert the "FIRE" gage. Place the beveled edge of the gage against the barrel notches, then allow the bolt to go forward by releasing the retracting slide handle.

b. The next step is to remove the backplate. To remove the backplate you must pull out on the backplate latch lock and up on the backplate latch and spade grips.

c. Inside the back of the receiver you will see the trigger lever and timing adjustment nut. Screw the timing adjustment nut down, to the left, until it rests lightly on the trigger lever. Apply strong pressure upward on the trigger lever with your thumb; the gun should not fire.

d. To set timing, turn the timing adjustment nut up, or to the right, one click at a time. After each click apply strong pressure upward on the trigger lever, attempting to release the firing pin.

e. When you hear the gun fire, turn the timing adjustment nut up two additional clicks. The reason for the additional clicks is, there are six clicks of timing between early and late timing. The gun has already fired on the first click, two more will give you a total of three clicks and approximate center of the proper timing adjustment.

f. Replace the backplate, remove the "FIRE" gage and recock the gun. Then push the bolt latch release and ease the bolt forward.

g. Move to the side of the gun and push back on the retracting slide handle and insert the "NO FIRE" gage in the same place the "FIRE" gage was, between the barrel extension and the trunnion block. The beveled edge of the gage should be against the barrel notches.

h. Depress the trigger; the gun should not fire. If the firing pin is released, the timing is too early. If early timing exists, the gun will fire two rounds and stop firing because the extractor does not come far enough forward to extract another round.

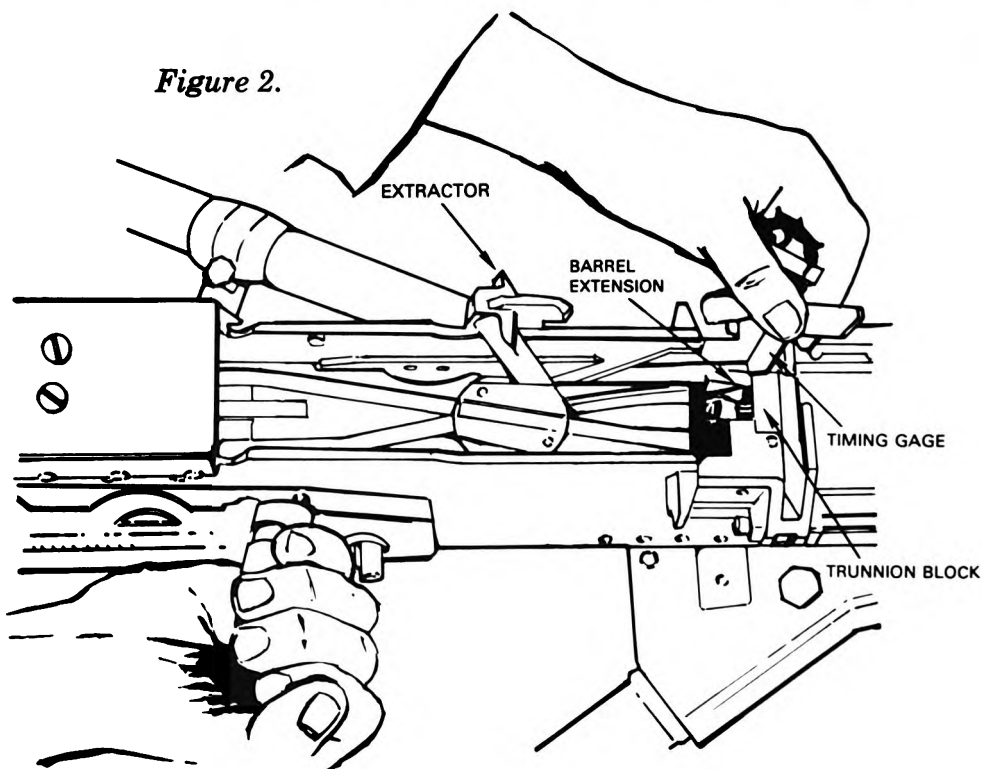
i. To correct early timing, remove the backplate and turn the timing adjustment nut all the way down until it rests lightly on the trigger level and begin again. This time insure that you press up firmly on the trigger lever each click. If the firing pin does not release when the "NO FIRE" gage is inserted, remove it and reinsert the "FIRE" gage. If the firing pin is released when the trigger is depressed, proper timing has been set.

j. There is a field expedient method for setting headspace and timing, but this field expedient method will not be used in training.

(1) To set headspace using the field expedient method, screw the barrel in all the way and back off two clicks or notches. Fire the gun. If it fires sluggishly, unscrew the barrel one more notch, and only one notch, and fire.

(2) To set timing, one dime or one dog tag can be used as a "FIRE" gage. For a "NO FIRE" gage, one nickle and one dime or four dog tags may be used.

*Figure 2.*



## REFERENCES:

FM 23-65, Browning Machinegun Caliber .50 HB, M2, May 72 (chap 3, sec I, page 77)

TM 9-1005-213-10, Operator's Manual: Machinegun, Caliber .50 Browning, M2, Jul 68 (page 18, para 2-4)

TEC Lesson 941-071-0117-F, Caliber .50 Machinegun, Headspace and Timing

**TASK NUMBER: 071-313-2314**

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**MOUNT/DISMOUNT AN/TVS-2 SIGHT ON CALIBER  
.50 MACHINEGUN**

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**CONDITIONS:**

Given an AN/TVS-2 sight in shipping container, a BA-1100/U battery, weapons adapter bracket, and a mounted .50 caliber machinegun; in daylight or artificial light.

**STANDARDS:**

1. **Mounting:** Within 10 minutes, the mounting bracket must be secured to the receiver group so that the cover will close, and the sight must be mounted on the adapter with the dovetail secured in its notch.
2. **Dismounting:** Remove the sight and mounting bracket and return them to the carrying case.

**PERFORMANCE MEASURES:**

1. To mount the AN/TVS-2 mounting bracket to the caliber .50 machinegun (see figure 1), begin by clearing the gun. Raise the cover (1). Loosen the four wingnuts (6) and four thumbscrews (5) on the weapon adapter bracket. Insure that the thumbscrews clear the bottom of the bracket. Slide the bracket (2) into the receiver group (3) with the cutaway portion toward the rear sight of the machinegun. Insure that the bracket is far enough to the rear so that the cover will close (4). Tighten the four thumbscrews (5) securely, then tighten the four wingnuts (6) to lock the bracket in place.
2. To mount the AN/TVS-2 sight to the weapons adapter bracket (see figure 2), remove the sight from shipping container. Loosen the boresight locking knob (2) by turning it counterclockwise. Slide the sight onto the rear of the dovetail notch on the right mounting bracket and push it to the front. Secure the sight by turning the boresight locking knob clockwise.
3. To conduct a function check on the AN/TVS-2:
  - a. Insure that the rotary control switch is OFF.
  - b. Insert the battery (BA-1100/U), positive end first.
  - c. Insure that the boresight cover is attached.

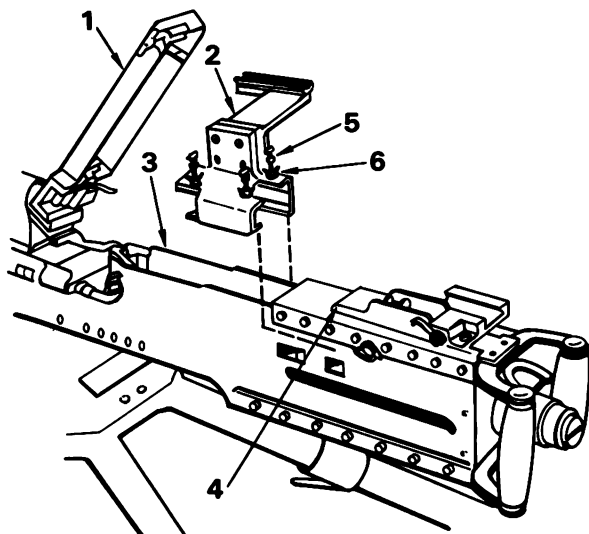


Figure 1.

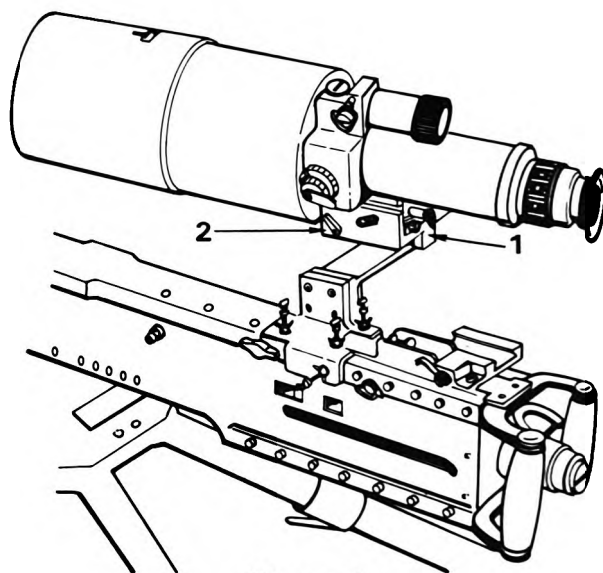


Figure 2.

d. Turn the rotary control switch to the CANT ILLUMINATION ON position, and adjust the cant adjustment knob until the cant level vial bubble is centered.

e. Turn the rotary control switch to the RETICLE ON TUBE ON position.

f. Adjust the reticle pattern intensity knob until the reticle pattern is visible.

g. Adjust the eyepiece focus ring so that the reticle dots appear sharp and clear.

4. To dismount the sight, reverse the mounting procedure detailed in Performance Measure 1 and return the AN/TVS-2 to the carrying case.

**NOTE:** Insure that the battery is removed from the AN/TVS-2 before storing the night sight.

## REFERENCES:

TC 23-13, AN/TVS-2 (Night Vision Sight, Crew-Served) Jan 67 (page 11)

TM 11-5855-202-13, Operator's manual for AN/TVS-2 (Night Vision Sight, Crew-Served) C4, Apr 67 (page 12, para 2-4)

TEC Lesson 953-071-0062-F, AN/TVS-2 Night Vision Sight for Crew-Served Weapons



**TASK NUMBER: 071-313-2315**

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**BORESIGHT AN/TVS-2 TO CALIBER .50  
MACHINEGUN**

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**CONDITIONS:**

Given an AN/TVS-2 mounted on a caliber .50 machinegun on the tripod; a defensive firing position, during daylight or at night, cleared for firing; and five rounds of loose caliber .50 tracer ammunition.

**NOTE:** The AN/TVS-2 comes in two models: 9927 and 9927A.

**STANDARDS:**

The gunner or assistant gunner within 15 minutes will:

1. During daylight, using an aiming point with the boresight cover in position, aline the sight reticle on the AN/TVS-2 with the barrel of the caliber .50 machinegun.
2. At night, using an aiming point at a known distance between 200 and 800 meters, aline the sight reticle dot on the AN/TVS-2 so that it coincides with the strike of a tracer round fired at the same aiming point.

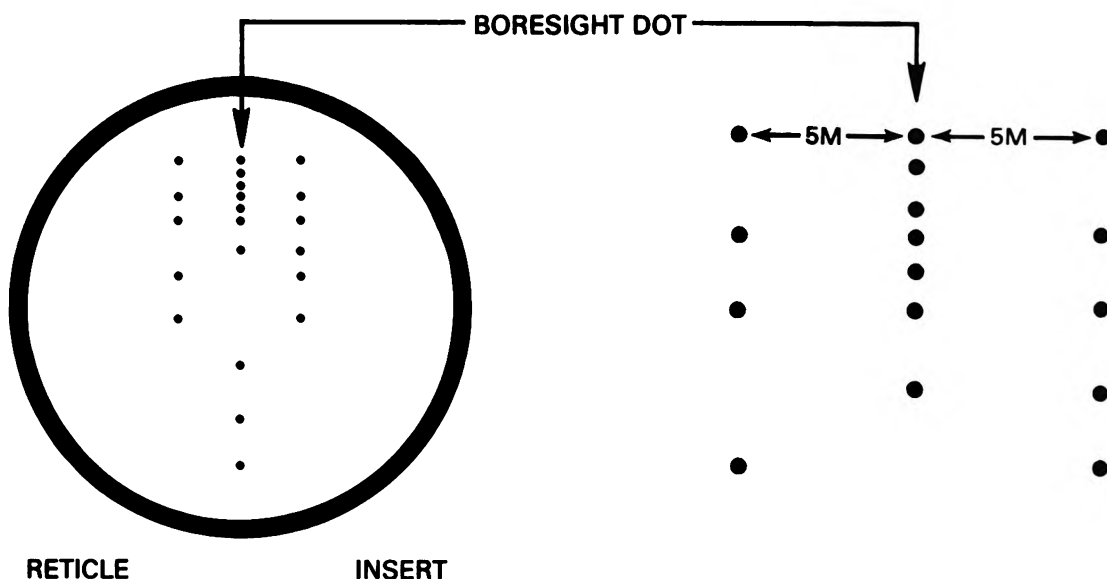
**PERFORMANCE MEASURES:****1. How to Boresight in Daylight:**

- a. Clear the gun and remove the backplate, driving spring assembly, and bolt group.
- b. Select an aiming point beyond the range of a likely target. With the head held to the rear of the receiver, sight through the barrel and aline it on the distant aiming point by moving the T&E mechanism of the gun. As a field-expedient, cut a piece of cardboard that will fit in the rear of the receiver after the backplate has been removed; make a pinhole in the cardboard, so that it is centered on the axis of the bore; and place two strings or threads across the muzzle with tape, one horizontal and the other vertical, being sure that the strings cross at the center of the muzzle. Sight through the pinhole and aline the crosshairs on the distant aiming point to get the right alinement.
- c. After the barrel is alined on the aiming point, and without disturbing the lay of the gun, check the cant level dial on the sight to be sure that the bubble is centered; if it is not, center it by moving the cant adjustment knob.
- d. With the rotary control switch in the fourth stop position (TUBE ON, RETICLE ON) and the boresight cover installed, aline the boresight dot of

the sight reticle (figure 1) on the same distant aiming point by rotating the azimuth and elevation screws on the sight.

e. Recheck the alinement of the bore and the sight. If the bore and the sight are laid on the same distant point, the weapon is correctly boresighted.

**2. How to Boresight at Night:** Remove the boresight cover and select a target at a known distance between 200 and 800 meters. Center the cant level dial of the sight. Lay the sight reticle dot corresponding to the range to the target by moving the T&E mechanism of the gun. Fire one tracer round and note the strike of the round in relation to the target. Make corrections on the azimuth and elevation screws of the sight to bring the strike of the round into the center mass of the target. Re-lay the gun and fire a confirming round. If the round does not hit the target, continue this process until a target hit is achieved.



*Figure 1. Sight reticle (9927A).*

## REFERENCES:

- TC 23-13, AN/TVS-2 Night Vision Sight, Jan 67 (chap 3, page 17)
- TEC Lesson 953-071-0062-F, AN/TVS-2 Night Vision Sight for Crew-Served Weapons (TBP)
- TEC Lesson 953-071-0063-F, AN/TVS-2 Engaging the Target

**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION IV**  
**HAND GRENADES, MINES, AND**  
**DEMOLITIONS**

---

**TASK SUMMARIES**



**TASK NUMBER: 071-325-4401**

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**PERFORM SAFETY CHECKS ON HAND GRENADES**

---

**CONDITIONS:**

Given any standard issue hand grenade.

**STANDARDS:**

Within 10 minutes:

1. Inspect grenade for any obvious defects.
2. Correct defects found; if not possible, turn in the grenade.
3. Demonstrate and use the correct procedure for carrying grenades.

**PERFORMANCE MEASURES:**

1. **Inspect Grenade for Defects** (figure 1):

a. Check to INSURE THAT FUZE IS NOT UNSCREWED from body of grenade.

b. Check to INSURE THAT SAFETY CLIP IS IN CORRECT POSITION.

c. IF NO SAFETY CLIP IS PRESENT, ATTACH CLIP to the grenade as follows:

- (1) Slide clip onto handle.
- (2) Attach loop portion of clip around grenade fuze.
- (3) Snap clip end around grenade safety lever.

d. Check safety pin.

(1) If pin is partially removed, carefully push it into place while holding lever securely down.

(2) If pin is bent, carefully bend it back into position.

e. CHECK SAFETY RING. Reject grenade if safety ring is cracked.

f. CHECK LEVER. Reject grenades with broken lever.

g. CHECK FOR DIRT. If dirty or grimy, wipe with damp or dry cloth.

h. CHECK FOR RUST Turn in grenade if rust is eating through it.



**TASK NUMBER: 071-325-4401**

---

**PERFORM SAFETY CHECKS ON HAND GRENADES**

---

**CONDITIONS:**

Given any standard issue hand grenade.

**STANDARDS:**

Within 10 minutes:

1. Inspect grenade for any obvious defects.
2. Correct defects found; if not possible, turn in the grenade.
3. Demonstrate and use the correct procedure for carrying grenades.

**PERFORMANCE MEASURES:****1. Inspect Grenade for Defects (figure 1):**

a. Check to INSURE THAT FUZE IS NOT UNSCREWED from body of grenade.

b. Check to INSURE THAT SAFETY CLIP IS IN CORRECT POSITION.

c. IF NO SAFETY CLIP IS PRESENT, ATTACH CLIP to the grenade as follows:

- (1) Slide clip onto handle.
- (2) Attach loop portion of clip around grenade fuze.
- (3) Snap clip end around grenade safety lever.

d. Check safety pin.

(1) If pin is partially removed, carefully push it into place while holding lever securely down.

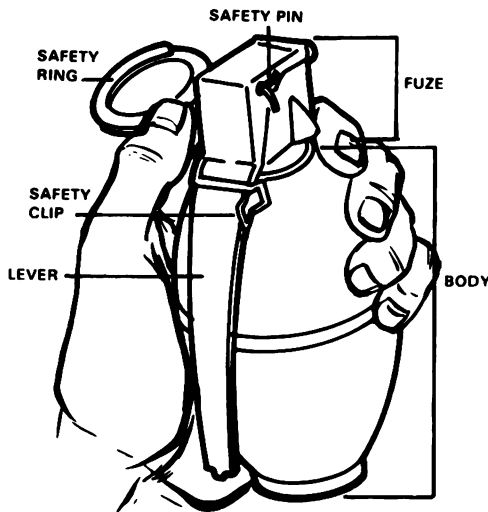
(2) If pin is bent, carefully bend it back into position.

e. CHECK SAFETY RING. Reject grenade if safety ring is cracked.

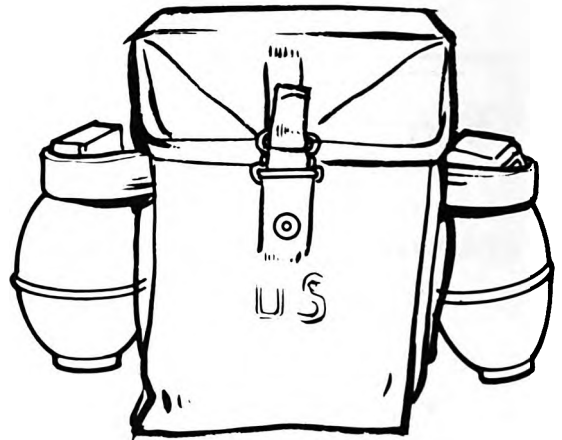
f. CHECK LEVER. Reject grenades with broken lever.

g. CHECK FOR DIRT. If dirty or grimy, wipe with damp or dry cloth.

h. CHECK FOR RUST Turn in grenade if rust is eating through it.



*Figure 1.*



*Figure 2.*

**2. Attaching Grenades to Ammo Pouches (figure 2):**

- a. First check the fuze for tightness. After checking the fuze for tightness, hold the web carrying sleeve on the side of the ammunition pouch and slide the grenade's safety lever into the sleeve.
- b. Be sure the pull ring or the safety pin is pointing downward.
- c. Wrap the carrying strap around the neck of the fuze, including the safety lever and the pull ring, and snap the carrying strap to the carrying sleeve.
- d. While moving, occasionally check the grenade to make certain the fuze is tight and the carrying strap is secure.

**REFERENCES:**

FM 23-30, Grenades and Pyrotechnic Signals, Dec 69 (chap 3, page 23)  
TM 9-1330-200-12, Operator's and Organization Maintenance Manual: Grenades, Hand and Direction, Sep 71 (chap 3, sec III, page 3-4, para 3-7)  
TEC Lesson 942-071-0002-F, Hand Grenade Maintenance and Identification



## TASK NUMBER: 071-325-4402

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**ENGAGE ENEMY TARGETS WITH HAND GRENADES**


---

**CONDITIONS:**

During daylight; wearing LBE, with individual weapon, given five M69 practice hand grenades, five M288 practice fuzes, and a requirement to engage the following targets at the designated ranges.

**Target 1** - dismounted enemy troops clustered at a range of approximately 35 meters. The situation and available cover will not permit moving closer to the target.

**Target 2a** - an enemy position with overhead cover (bunker, building, cave, etc.) which can be approached along a covered route.

**Target 2b** - an enemy emplacement without overhead cover (foxhole, trench or mortar emplacement) at a range of 20 meters. The situation and available cover will not permit moving closer to the target.

**Target 3** - an enemy position with overhead cover (bunker, building, cave, etc.) which can be approached along a covered route.

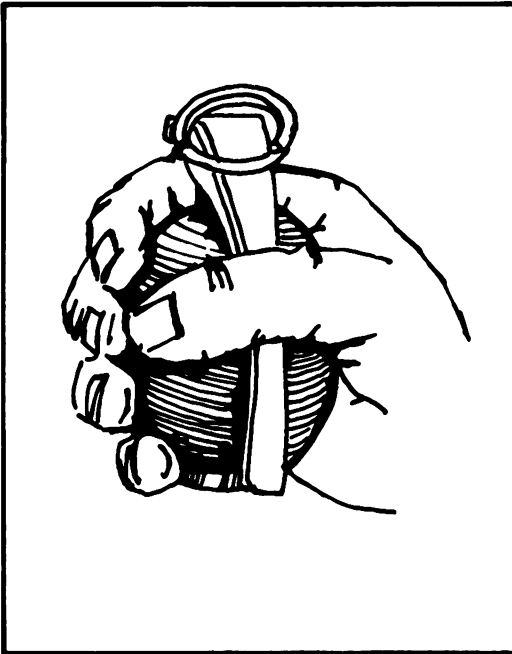
**STANDARDS:**

For each target, throw at least one grenade so that it explodes within the effective bursting radius for that target as listed below without exposing yourself for more than 3 seconds at any one time.

TARGET	EFFECTIVE ENGAGEMENT
No. 1 Troops in the open	Within 5 meters of center
No. 2 Troops dug in without overhead cover	Inside of position
No. 3 Troops with overhead cover	Inside of enclosure

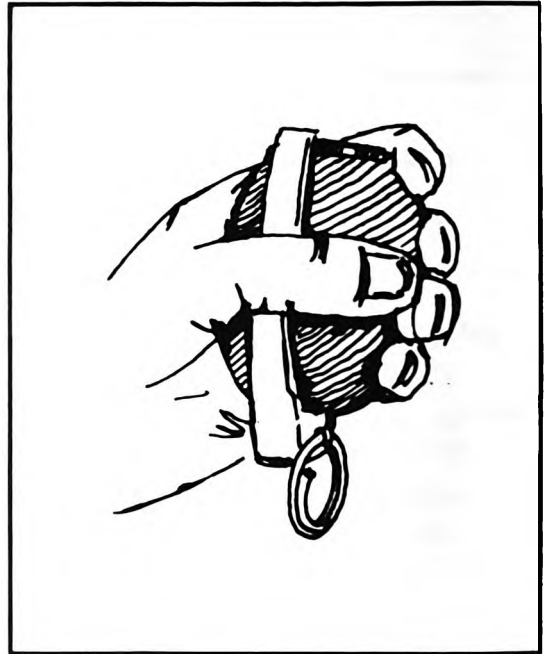
**PERFORMANCE MEASURES:****1. Throwing Hand Grenades.**

a. **The Grip.** The safest and easiest way to grip a hand grenade for throwing is to hold it so that the safety lever is held down by the thumb while keeping the pull ring (and safety clip if present) free and facing the nonthrowing hand (figures 1 and 2).



*Proper grip of the grenade  
(right-hand thrower).*

*Figure 1.*



*Proper grip of the grenade  
(left-hand thrower).*

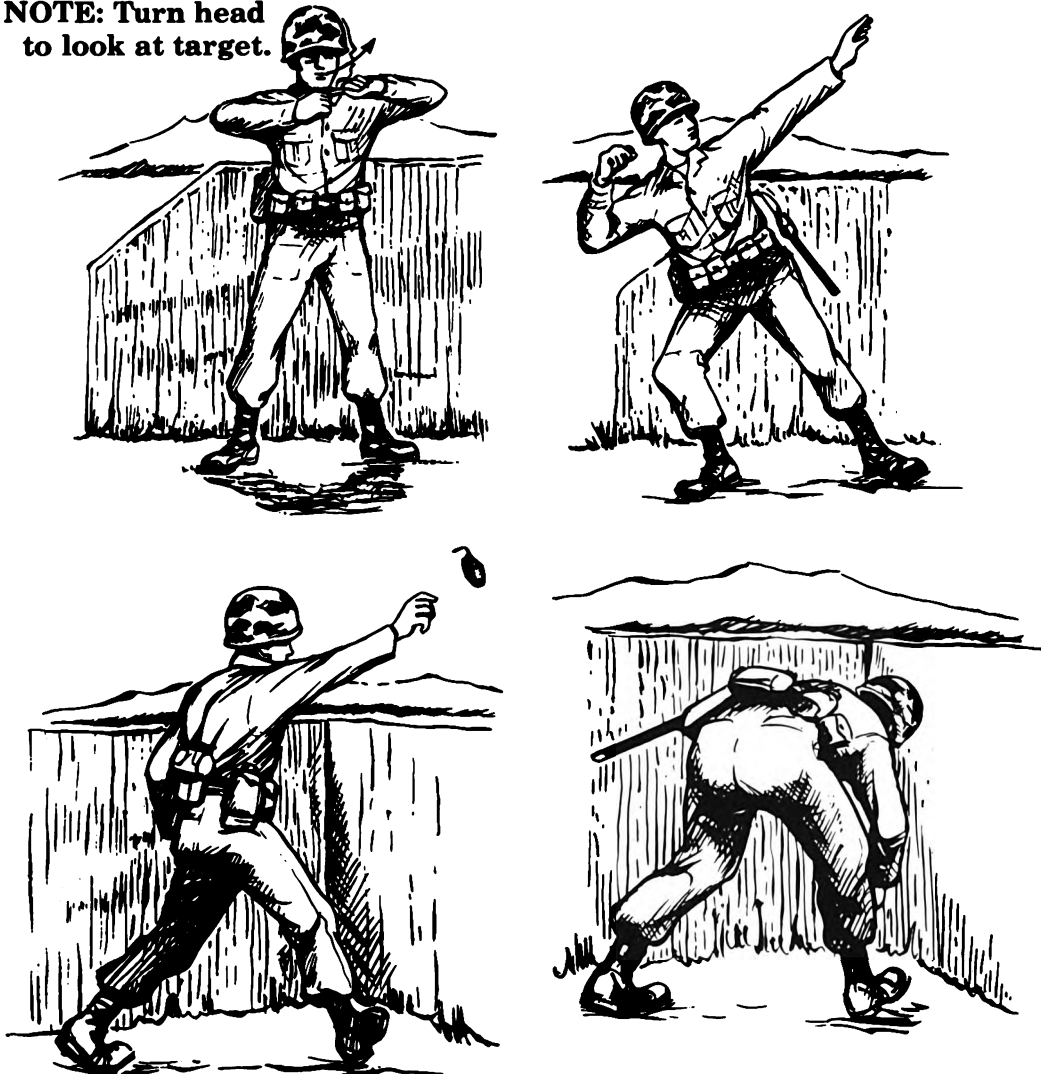
*Figure 2.*

b. **Body Positioning and Arming.** No matter what position is used (standing, kneeling, prone) when throwing a hand grenade, you should be as comfortable and natural as possible. The two most important points in accurate throwing are body-target alinement and eye-target focus. Line your body up with the target as though you were going to throw a football or baseball. Keep watching the target as you throw, and let your arm swing naturally to it. Follow through with your throwing motion and take cover. If possible, you or a buddy should watch where the grenade lands. Make sure you properly arm the grenade before you throw it. Remove the safety clip, pull the pin, throw the grenade.

c. To Throw a Hand Grenade (figure 3):

- (1) Look at the target and judge the distance to it.
- (2) Line your body up so you can throw comfortably.
- (3) Hold the grenade under your chin and with the index finger of your other hand pull and twist the pull ring (at the same time pull the safety clip off the lever with your thumb).
- (4) As the pin is removed, look back at your target.
- (5) Keeping your eye on the target, throw the grenade overhanded.
- (6) Release the grenade after it comes into your field of vision and follow through.

**NOTE:** Turn head to look at target.

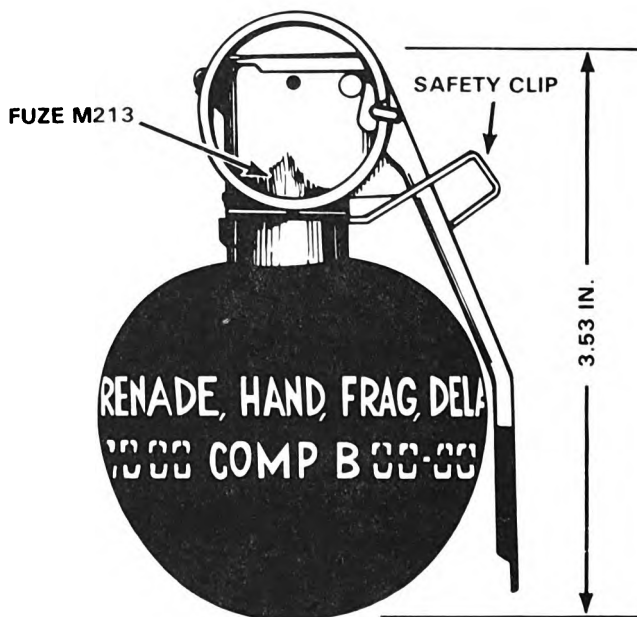


*Figure 3. Throwing a grenade.*

2-IV-A-2.3

**NOTE:** One exception to this procedure is the riot control grenade ABC-M25A2. Since there is no lever, you must hold the arming sleeve down instead. Use the thumb of your throwing hand to do this.

d. **Using Fragmentation Grenade M67 with Time Delay Fuze M213 (figure 4).** This grenade is your best all-round choice. It can be thrown a little over 40 meters by most soldiers and will kill or injure exposed soldiers who are within 15 meters of it when it explodes. You should, with some practice, be able to throw the grenade to within 5 meters of a selected point 35 meters away from you or within a fighting position 2 meters wide at 20 meters range. Grenades thrown at these targets may hit and roll into the target area, but you should practice to hit the fighting position 'on the fly' in order to destroy positions with frontal cover. Another technique which can be employed with these grenades is the cookoff. To do this, you release the safety lever and hold the grenade for a two-count (YOU MUST NOT HOLD IT LONGER, HOWEVER). Then when the grenade is thrown, enemy personnel will not have time to pick it up and throw it back. In addition, if it is thrown high into the air, it can explode over the target (airburst).



*Figure 4. Fragmentation hand grenade M67.*

**e. Safety.**

- (1) Do not modify grenades in any way (tape or wire, etc.).
- (2) Do not attempt to defuze grenades.
- (3) Do not remove or use grenades found upside down in their packing containers.
- (4) Do not handle dud grenades at anytime.
- (5) Do not attach grenades to clothing or equipment by the pull ring.
- (6) When using the cookoff technique, do not hold the grenade for more than 2 seconds for any reason.

**2. Training Tips.**

a. Train for results, not the process. Distance and accuracy are the desired results of training, not constant practice of step-by-step body positions. Concentrate on body-target alinement, eye-target focus, safety procedures, and the result - a target kill.

b. Use training grenades (of the type similar to the grenades in your unit's ASP) with practice fuzes. Use expended practice fuze heads with safety levers, safety pin, and safety clip for all training when 'live' practice fuzes are not available.

c. Key on not exposing yourself for more than 3 seconds when throwing grenades.

d. Train to minimum standards and then go on to continually higher standards and more complicated techniques (cookoff and airbursts).

**REFERENCES:**

**FM 23-30, Grenades and Pyrotechnic Signals, Dec 69 (chap 3, page 21-25)**

**TM 9-1330-200-12, Operator's and Organization Maintenance Manual: Grenades, Hand and Direction, Sep 71 (chap 2, pages 2-5 and 2-45)**

**TEC Lesson 942-071-0001-F, The Hand Grenade - Types and Uses**  
**TEC Lesson 942-071-0002-F, Hand Grenade Maintenance and Identification**

**TEC Lesson 942-071-0003-F, The Hand Grenade - Carrying, Arming, and Throwing**



**TASK NUMBER: 071-325-4405**

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**IDENTIFY AND EMPLOY HAND GRENADES**

---

**CONDITIONS:**

During daylight, in a field location, wearing field clothing, steel helmet, and load-bearing equipment (LBE), and carrying your individual weapon and basic load of ammunition, given fragmentation grenades with time-delay fuzes, fragmentation grenades with impact-detonating fuzes, offensive (concussion) hand grenades and several special purpose grenades.

**STANDARDS:**

1. Be able to identify any of the hand grenades listed in performance measure 1 by its shape, color, and/or marking.
2. Select the correct hand grenade for each of the following:
  - a. To disable or kill personnel.
  - b. To signal.
  - c. To screen (provide concealment).
  - d. To control riots or disable without serious injury.

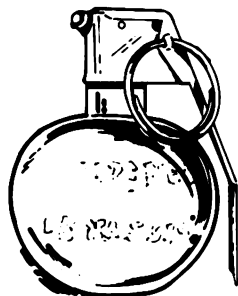
**PERFORMANCE MEASURES:**

1. **Identification of hand grenades.** You must be able to identify those grenades which you will usually find within your unit by their shape, color, and/or markings. Figures 1 through 6 will assist you in becoming familiar with the more common grenades currently available.

2. **Uses of hand grenades.** Hand grenades can assist you in accomplishing six different missions:

a. To disable or kill personnel - Use fragmentation or concussion grenades (M67, M68, M26A1, M56, M57, M33, M59, or MK3A2). Fragmentation grenades M68, M57, and M59 are fuzed for exploding on impact after 1 second or within 4 seconds without impact. The other frag grenades (M67, M26A1, and M56) and the offensive (concussion) grenade MK3A2 will explode 4 to 5 seconds after the safety lever is released.

b. To signal - Use M18 Colored Smoke or M34 WP Smoke. [Extreme caution should be used if the M34 is used since it can produce casualties up to 35 meters away from where it explodes.]



*Figure 1. M33, FRAGMENTATION HAND GRENADE. Color/Markings - OD with single yellow band and printing.*



*Figure 2. ABC-M25A2, CS RIOT CONTROL HAND GRENADE. Color/Markings - Gray, red band(s) and red printing.*



*Figure 3. M34, WP SMOKE HAND GRENADE (STANDARD COLOR AND MARKINGS). Color/Markings - Light green, yellow band, red printing.  
Old Markings - Light gray, yellow band, yellow printing.*



*Figure 4. AN-M8, HC SMOKE HAND GRENADE. Color/Markings - Light green, black printing, white top.  
NOTE: M18 Colored Smoke looks the same but the top is the same color as the smoke.*



*Figure 5. An/M14, TH 3 INCENDIARY HAND GRENADE. Color/Markings - Light red with black printing.  
Old Markings - Gray with purple band and purple printing.*



*Figure 6. M67, FRAGMENTATION HAND GRENADE. Color/Markings - Same as M33.  
NOTE: M68 looks the same but has red safety lever with word "IMPACT" on it.*



c. To screen (provide concealment) - Use AN-M8 Smoke Grenade. If the AN-M8 is not available, the M18 Colored Smoke or M34 Smoke may be used although they are not as effective as the AN-M8. [If M34 WP Smoke grenades are used, use caution as noted in b., above.]

d. To provide light (illuminate) - Use the MK1.

e. To start fires - Use the AN-M14, TH 3 Incendiary. [The M34 WP Smoke, MK1, and canister-shaped riot control grenades can also start fires but should not be relied upon.]

f. To control riots or disable without serious injury - Use the riot control grenades ABC-M7A2 (canister-shaped) or ABC-M25A2 (baseball-shaped) grenades. [Caution: The ABC-M25A2 is a bursting-type grenade which can cause injury up to 5 meters away.]

### 3. Employing hand grenades.

**NOTE: This section will address fragmentation and offensive (concussion) grenades only, since these are the ones you will normally be required to use.**

a. Fragmentation grenade with time delay fuze: M67 (figure 6) and the M33 (figure 1).

These grenades are your best all-round choice. They can be thrown a little over 40 meters by most soldiers and will kill or injure exposed soldiers who are within 15 meters of them when they explode. You should, with some practice, be able to throw the grenade to within 5 meters of a selected point 35 meters away from you or within a fighting position 2 meters wide at 20 meters range. Grenades thrown at these targets may hit and roll into the target area, but you should practice to hit the fighting position 'on the fly' in order to destroy positions with frontal cover. Another technique which can be employed with these grenades is the cook-off. To do this, you release the safety lever and hold the grenade for a two count (YOU MUST NOT HOLD IT LONGER, HOWEVER). Then when the grenade is thrown, enemy personnel will not have time to pick it up and throw it back. In addition, if it is thrown high into the air, it can explode over the target (airburst).

b. Fragmentation grenade with impact detonating fuze: M68, M57 and M59.

Like the time delay grenades, these can be thrown about 40 meters and have the same effect except that they explode as soon as they hit something. With these, you must hit the target 'on the fly,' not on a bounce or roll. For safety, they do not arm until 1 second after releasing the lever, so if you drop it you can still recover it and throw it. If it hits something before 1 second has passed and comes to rest, it will explode after 3 or 4 more seconds. This grenade is best used when you want to insure enemy soldiers don't return it or on steep hills where the delay fuze grenade might roll away from the target.

c. Offensive hand grenade, MK3A2. This canister-shaped grenade can also be thrown about 40 meters, but its effectiveness against targets in the open is not very good. Against targets in confined spaces such as rooms, bunkers, or caves, it is the best choice.

**REFERENCES:**

**FM 23-30, Grenades and Pyrotechnic Signals, Dec 69 (chap 2, page 5, para 3; pages 8 thru 20, para 9 thru 30)**  
**TEC Lesson 942-071-0001-F, The Hand Grenade - Types and Uses**  
**TEC Lesson 942-071-0002-F, Hand Grenade Maintenance and Identification**

## TASK NUMBER: 051-192-1502

---

**INSTALL AND FIRE/RECOVER AN  
M18A1 CLAYMORE MINE**

---

**CONDITIONS:**

Given an M18A1 antipersonnel mine (inert) (claymore), an M57 firing device, an M40 test set, and a firing wire with inert blasting cap, packed in an M7 bandoleer; a designated installation site; a firing position at least 16 meters from the installation site; and a sandbag.

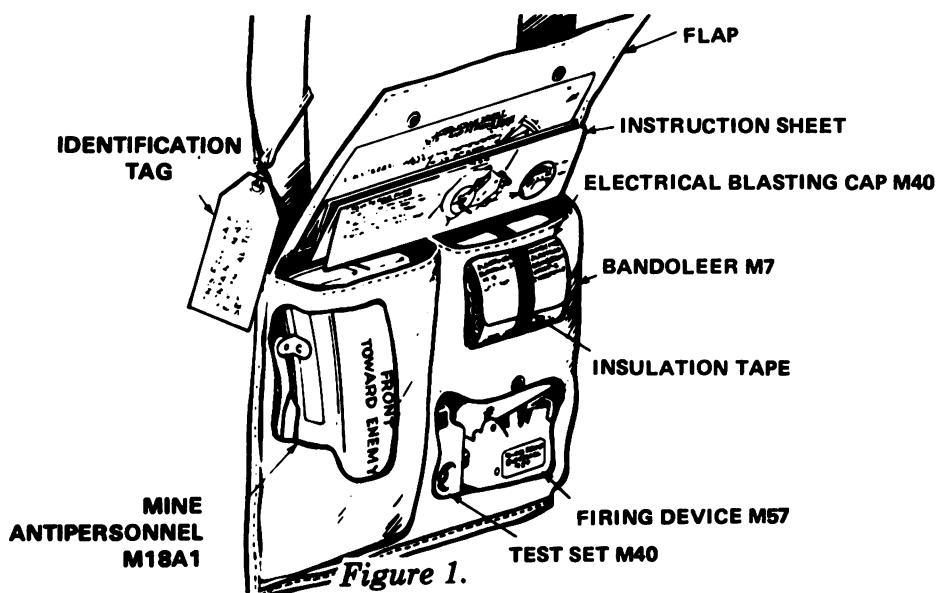
**STANDARDS:**

1. Install the claymore facing the center of mass of a kill zone.
2. Claymore is recovered and repacked in the bandoleer if not detonated.

**PERFORMANCE MEASURES:****1. Installing the M18A1 Claymore Mine.**

a. Account for all accessories in the bandoleer (figure 1) and read the attached instruction sheet. Remove the electrical firing wire, leaving the mine and other accessories in the bandoleer.

**WARNING:** During installation, the M57 firing device must be kept in the possession of the individual installing the mine to prevent accidental firing by another individual.



b. Tie the shorting plug end of the firing wire (figure 2) to a fixed object (stake, tree, etc.) at your firing position. Place the bandoleer on your shoulder and unroll the firing wire to the selected position for emplacing the mine.

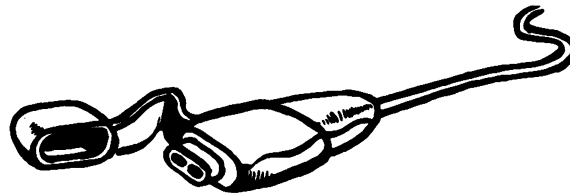


Figure 2.

c. Remove the mine from the bandoleer. Open both pairs of legs to a 45-degree angle with two legs facing to the front and two legs facing to the rear of the mine (figure 3).

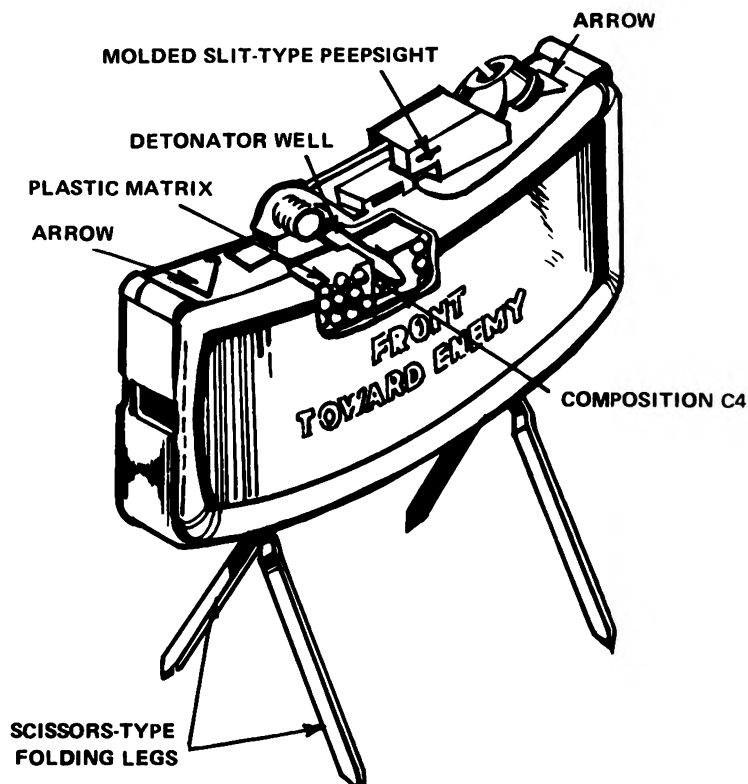


Figure 3.

c. Push the legs approximately 1/3 of the way into the ground with the mine facing in the desired direction of fire.

## 2. Aiming the Mine.

a. Select an aiming point (tree, large rock, etc.) approximately 50 meters (150 feet) to the front of the mine and approximately  $2\frac{1}{2}$  meters (8 feet) above the ground using the slit-type peepsight (figure 4).

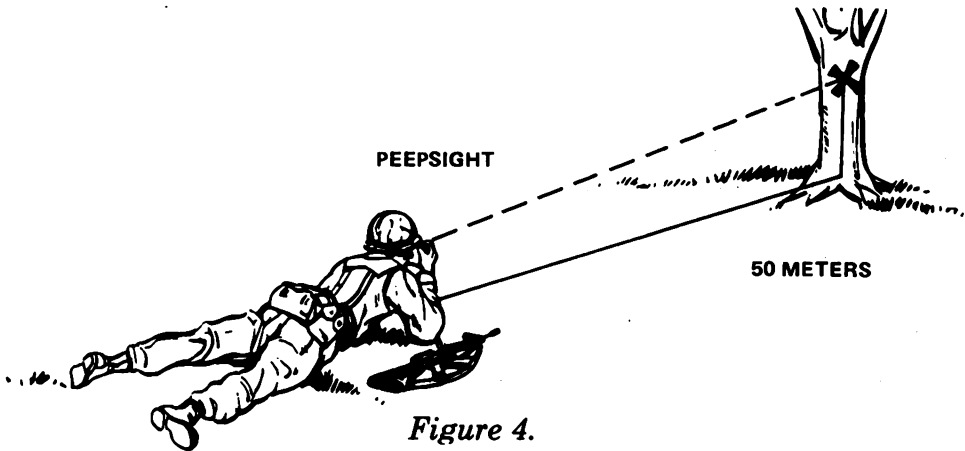


Figure 4.

b. Position the eye about 6 inches to the rear of the sight while sighting through the peepsight. The groove of the sight should be in line with the aiming point. The aiming point should be in the center of the desired area of coverage with the bottom edge of the peepsight parallel to the ground which is to be covered with the fragment spray (figure 5).

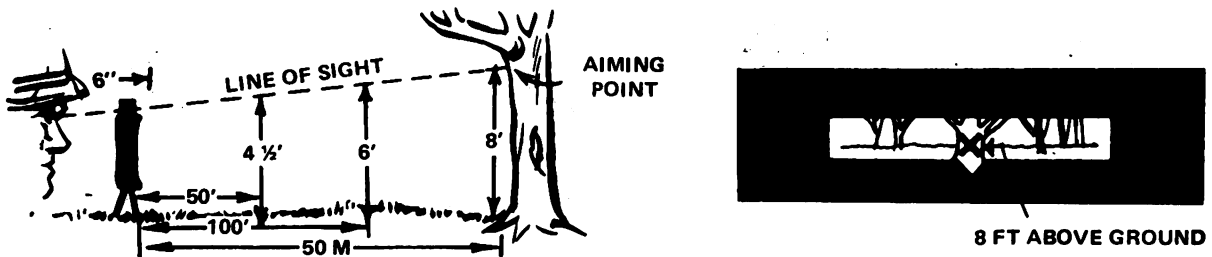


Figure 5.

c. Using the knife-edge sight, select an aiming point at ground level approximately 50 meters (150 feet) in front of the mine (figure 6). Position

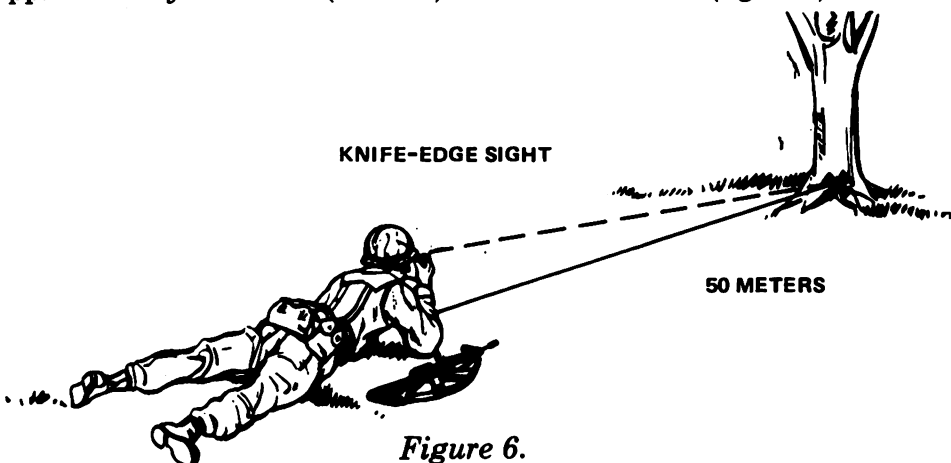


Figure 6.

the eye approximately 6 inches to the rear of the sight and aline the two edges of the sight with the aiming point (figure 7).

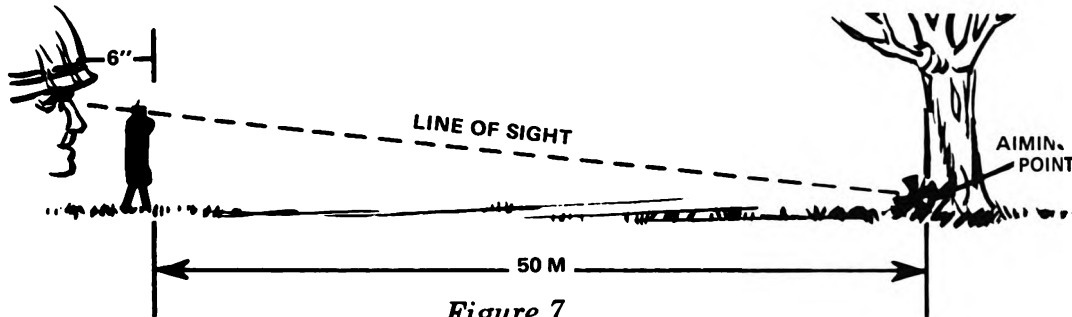


Figure 7.

d. After aiming the mine, secure the firing wire approximately 1 meter to the rear of the mine so it will not become misaligned if the firing wire is disturbed.

**3. Testing the Circuit.** To conduct a circuit test, remove the dust cover from the connector of the M57 firing device and from the female connector of the M40 test set. Plug the test set into the firing device (figure 8). Position the firing device bail to the FIRE position and actuate the handle of the firing device with a firm, quick squeeze and observe the window of the test set for a flash of light (figure 8). The flashing light indicates that the M57 firing device and M40 test set are functioning correctly. Remove the shorting plug dust cover from the connector of the firing wire and from the end of the test set. Plug the connector of the firing wire into the test set (figure 9). Place a sandbag over the blasting cap.

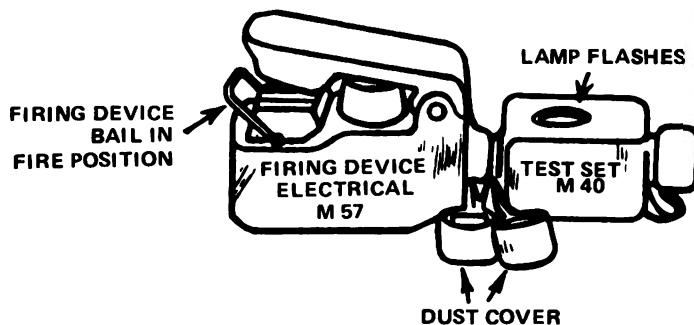


Figure 8.

Place the M57 firing device bail in the fire position and actuate the handle. The lamp in the window of the M40 test set should flash.

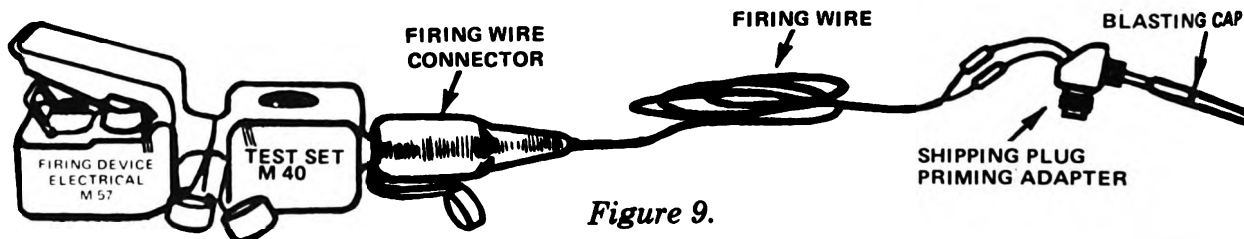


Figure 9.

**NOTE:** Circuit testing is conducted without the blasting cap inserted into the detonator well. Insure that no friendly personnel are near the blasting cap, as it may detonate.

#### 4. Arming the Mine.

a. After circuit testing, return to the mine (with the firing device in firer's possession) and unscrew one of the shipping plug priming adapters from the mine. Slide the slotted end of the shipping plug priming adapter onto the firing wires of the blasting cap between the crimped connections and the blasting cap. Pull the excess wire through the slotted end of the adapter until the top of the blasting cap is firmly seated in the bottom portion of the shipping plug priming adapter (figure 9). Screw the adapter with blasting cap into the detonator.

**WARNING:** Make certain that the face of the mine marked "FRONT TOWARD ENEMY" and the arrows on top of the mine point in the direction of the enemy.

b. Recheck the aim of the mine. Camouflage the mine and, if possible, bury the firing wire and move back to the firing position.

**NOTE:** The firing position should be in a foxhole or covered position at least 16 meters to the rear or the side of the emplaced mine.

c. Prior to connecting the firing device to the firing wire, make certain that the safety bail is in the SAFE position (figure 10) and all friendly troops within 250 meters to the front and sides and 100 meters to the rear of the mine are under cover. Do not connect the firing device to the firing wire until actual time of firing.

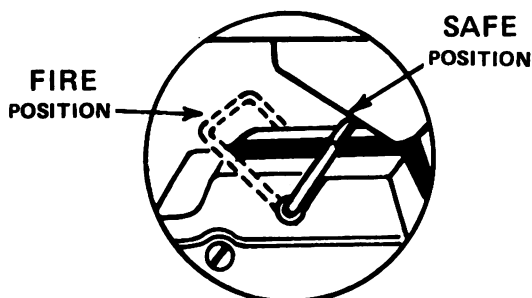


Figure 10.

7. **Firing the Mine.** To fire the mine, remove dust covers from the firing device and firing wire and connect the firing device to the firing wire. When the lead elements of an enemy formation approach within 20 to 30 meters of the mine, position the firing device safety bail in the FIRE position (figure 10) and actuate the firing device handle with a firm, quick squeeze.

8. **Disarming the Mine.** To disarm the mine, make certain the firing device safety bail is in the SAFE position. Disconnect the firing wire from the firing device and replace dust covers. Keep the firing device in your

possession throughout recovering the mine. Unscrew and remove the shipping plug primary adapter containing the blasting cap. Separate the two and reverse the shipping plug priming adapter, and screw the plug end of the adapter into the detonator well. Remove the firing wire from the stake and reroll the blasting cap and wire and placed in its cardboard container. Remove the mine from its emplacement. Repack the mine and accesories into the bandoleer.

**SQT REQUIREMENTS:** The soldier is not required to camouflage the mine, or to bury the wire.

## **REFERENCES:**

**FM 23-23, Antipersonnel Mine M18A1 (Claymore), C2, Jan 66 (chap 2, sec III, page 2 thru 7)**

**TEC Lesson 947-071-0106-F, Claymore Mines, Introduction, Circuit Testing and Emplacement**

**TEC Lesson 947-071-0107-F, Claymore Mines, Electrical Arming and Firing**

**TEC Lesson 947-071-0109-F, Claymore Mines, Disarming, Recovery and Emergency Destruction Procedures**



## TASK NUMBER: 051-192-1505

## INSTALL THE M18A1 CLAYMORE WITH TRIPWIRES

## CONDITIONS:

Under any environmental conditions, given a claymore mine(s), nonelectric blasting caps, detonating cord (approximately 25 meters), an M3 or M1 firing device, roll of tape, and M2 crimpers, with a requirement to install the mine in a hasty protective minefield.

**NOTE:** For training purposes use the appropriate training devices.

## STANDARDS:

Without premature detonation, install the mine IAW the performance measures so that detonation will occur as designed.

## PERFORMANCE MEASURES:

1. **Installing and Aiming the Claymore.** Follow the steps in performance measures 1 and 2 contained in the task: **Install and Recover an M18A1 Claymore Mine.**

2. **Setting up the Claymore to Fire with Tripwires.** Setting up the claymore can be done several ways; figure 1 shows two methods. For purposes of this task, only the method in figure 1a will be explained.

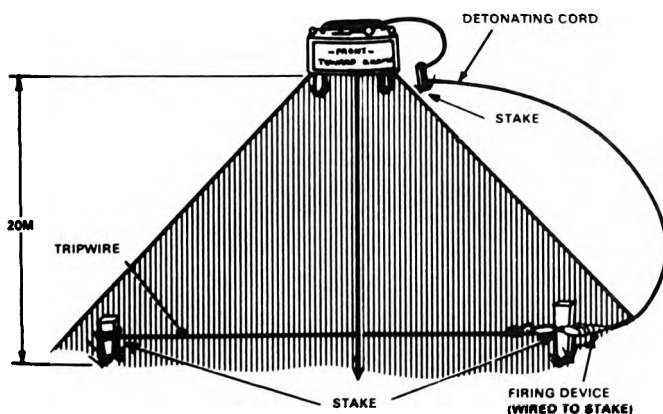


Figure 1a.

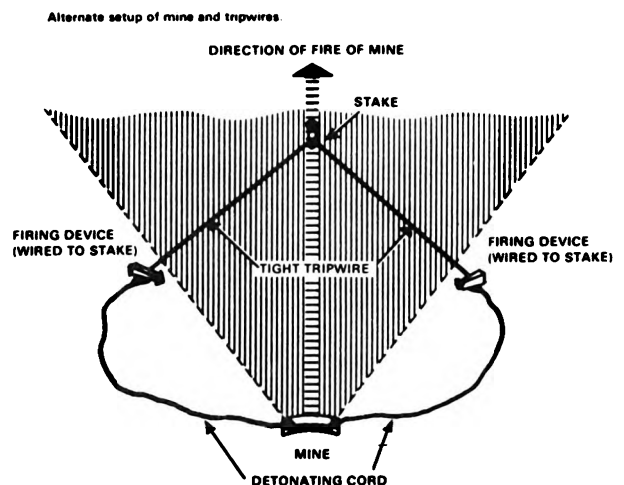
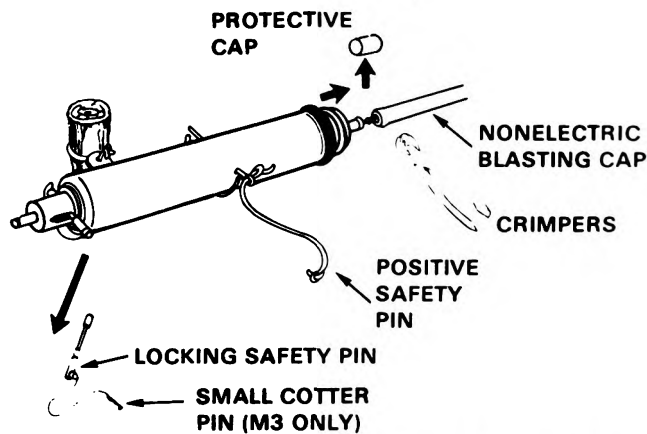


Figure 1b.

### 3. To Arm the Claymore with Tripwires:

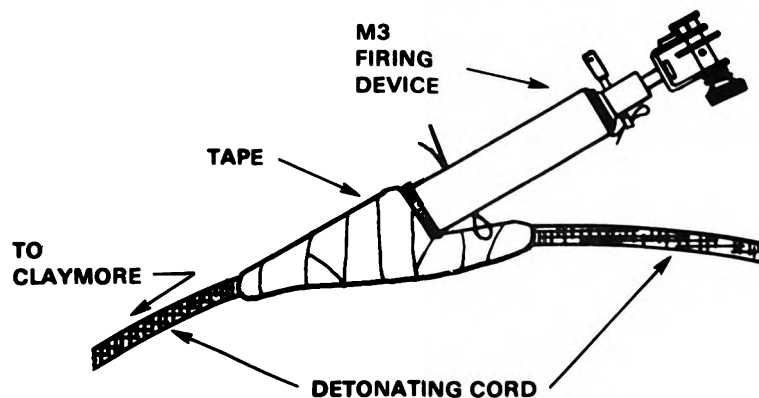
- a. Emplace two anchor stakes, approximately 20 meters to the front of the mine, and space them 10-20 meters apart (figure 1a).
- b. Emplace one stake to one side of, and approximately 1 meter from, the mine.
- c. To install the firing device.
  - (1) Remove protective cap.
  - (2) With crimpers, attach blasting cap to standard base (figure 2).

**WARNING:** Crimper jaws should be placed no farther than 1/4 inch from open end of blasting cap.



*Figure 2. Attaching the nonelectric blasting cap.*

- (3) Take the detonating cord and tape one end of the cord to the firing device end containing the nonelectric blasting cap as shown in figure 3.



*Figure 3. Method of taping M3 firing device to detonating cord.*

(4) Using tape, wire, twine, or cord, fasten the firing device securely to one of the stakes you emplace in step 3a (figure 1a).

d. Secure a length of tripwire first to the opposite forward stake and then to the firing device. If using the M1, attach the tripwire to the pull ring. If using the M3, insert the tripwire into the hole in the winch. Then draw up the tripwire by turning the knurled knob until the locking safety pin is pulled into the wide portion of safety pin hole.

e. Return to the mine and wrap the loose end of the detonating cord securely around the nearby stake, leaving at least 1 meter of cord overhang.

f. Carefully insert the loose end of the detonating cord into a nonelectric blasting cap and crimp.

**WARNING: Crimper jaws should be placed no farther than 1/4 inch from open end of blasting cap.**

g. Seat the cap (with detonating cord) in the shipping plug priming adapter and carefully insert the cap into the well.

h. Secure the cap in the detonator well by carefully screwing the shipping plug priming adapter into the detonator well.

i. Recheck the mine for proper aim.

j. Return to the firing device and, with the attached string, carefully pull out the locking safety pin. If using the M3, first remove the small cotter pin from the end of the locking safety pin. If the locking safety pin does not remove easily from the M3, adjust the winch winding.

k. With attached string (M1 or M3), carefully remove the positive safety pin. If any difficulty is encountered, replace all safety pins, and replace firing device with another.

## REFERENCES:

**FM 23-23, Antipersonnel Mine, M18A1 and M18 (Claymore), C1, 2, Jan 66 (chap 2, page 14-16, para 13)**

**TEC Lesson 947-071-0106-F, Claymore Mines, Introduction**

**TEC Lesson 947-071-0107-F, Electrical Arming and Firing**

**TEC Lesson 947-071-0108-F, Nonelectrical Arming and Firing**

**TEC Lesson 947-071-0110-F, Multiple Emplacement and Review**



**TASK NUMBER: 051-192-1506****DISARM THE M18A1 CLAYMORE WITH TRIPWIRES****CONDITIONS:**

Under any environmental conditions, given a claymore mine that has been installed in a hasty protective minefield with tripwires, M2 crimpers or any sharp cutting instrument, claymore carrying pouch, length of wire, nail or the safety and locking pin for the firing device, approximately 25 feet of string, and a requirement to recover the claymore.

**NOTE:** You will be told what type firing device was used to arm the claymore.

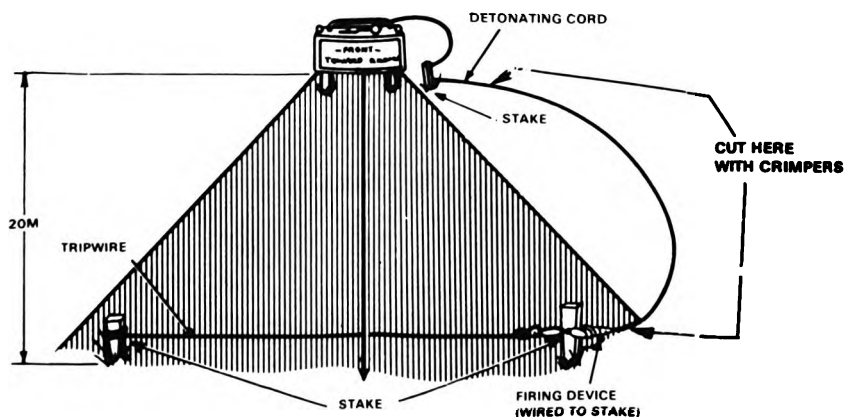
**STANDARDS:**

Disarm and recover the claymore mine IAW performance measures below.

**PERFORMANCE MEASURES:**

1. Disarming the claymore requires a great deal of practice and attention to detail. Usually, the claymore, installed nonelectrically (with tripwires), will be a part of a hasty protective minefield. This means that before attempting to disarm the mine, care must be taken to determine the location and firing configuration of other nearby mines. Once this has been done, the mine and attached tripwires must be inspected to determine if they have been damaged, boobytrapped, or otherwise altered.

**WARNING:** If at any time the mine appears to be damaged or altered, consider it unsafe. Report it to your supervisor.



2. To disarm mines equipped with the M3 firing device:

- a. Move to the claymore and, with the M2 crimpers, cut the detonating cord between the claymore and the anchor stake.
- b. Unscrew and remove the shipping plug priming adapter, containing the blasting cap, from the mine.
- c. Remove the blasting cap attached to the detonating cord, reverse the shipping plug priming adapter, and screw it back into the detonator well.
- d. Replace the claymore in its carrying pouch.
- e. Move to the firing device and, with the crimpers, cut detonating cord 1 foot from the point where it is taped to the blasting cord.

**WARNING: The M3 is dangerous to disarm. It should be blown in place (tactical situation permitting).**

f. If the device must be disarmed, proceed as follows:

- (1) Insert length of wire, nail, or original pin in positive safety pin hole.
- (2) Insert length of wire, nail or original locking pin in locking pin hole.
- (3) Disassemble tripwire, firing device, and blasting cap.

g. If the device is to be blown in place, proceed as follows:

- (1) Attach a length of string, WD-1/TT wire, or twine (approximately 25 feet) to the tripwire.
- (2) Move a safe distance away and pull string.

3. To disarm mines equipped with the M1 firing device.

a. Disarm the M1 firing device by:

- (1) Inserting the locking safety pin in safety pin hole.
- (2) Cut the detonating cord free of the M1 using the crimpers.
- (3) Disconnect the tripwire.
- (4) Recover firing device, stakes, and tripwire.

b. Move to the claymore and do the following:

- (1) Cut the blasting cap free of the detonation cord.
- (2) Unscrew and remove the shipping plug priming adapter containing the blasting cap from the mine.
- (3) Remove the blasting cap attached to the detonating cord, reverse the shipping plug priming adapter, and screw it back into the detonator well.

(4) Replace the claymore in its carrying pouch.

c. To dispose of the crimped blasting caps, either attach them to other demolitions which will be detonated, or turn them over to your supervisor.

d. Recover the mine, tripwire and stakes.

**REFERENCES:**

**FM 5-25, Explosives and Demolitions, Feb 71 (chap 1, page 1-26, 1-29, and 1-34 thru 1-36, para 1-51, 1-57j, k)**





**TASK NUMBER: 051-192-1008**

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**INSTALL THE M21 METALLIC ANTITANK (AT) MINE**

---

**CONDITIONS:**

You are participating in a tactical operation, given any number of M21 AT mines, M607 fuze, extension rod, extension rod adapter, M120 boosters, M26 arming wrench, intrenching tool and bayonet, and a requirement to install the mine(s) in a hasty protective minefield.

**NOTE:** For training purposes, use inert devices.

**STANDARDS:**

Without premature detonation, the mine will be installed IAW the performance measures so that detonation will occur as designed.

**PERFORMANCE MEASURES:**

**1. To install a mine for pressure activation, using the M607 fuze without tilt rod:**

- a. Remove the mine and components from the packing box.
- b. Replace the extension rod and extension rod adapter, if present, in the packing box.
- c. Inspect the mine and components for serviceability.
- d. Check for cracks, dents, or other signs of damage.
- e. Insure that the cotter pin of the fuze pull ring assembly and the fuze closure assembly are securely in place.
- f. If damaged items are found, replace with a new mine.

**2. To prepare the M21 AT mine for laying:**

a. The numbers of steps 1 through 8 below relate to the numbers in figure 1.

(1) Turn mine bottom up and, with the screwdriver end of the M26 arming wrench, remove the closing plug assembly by turning counter-clockwise.

(2) Inspect booster cavity and remove foreign material.

(3) Insert M120 booster, washer side toward the fuze, into the booster cavity.

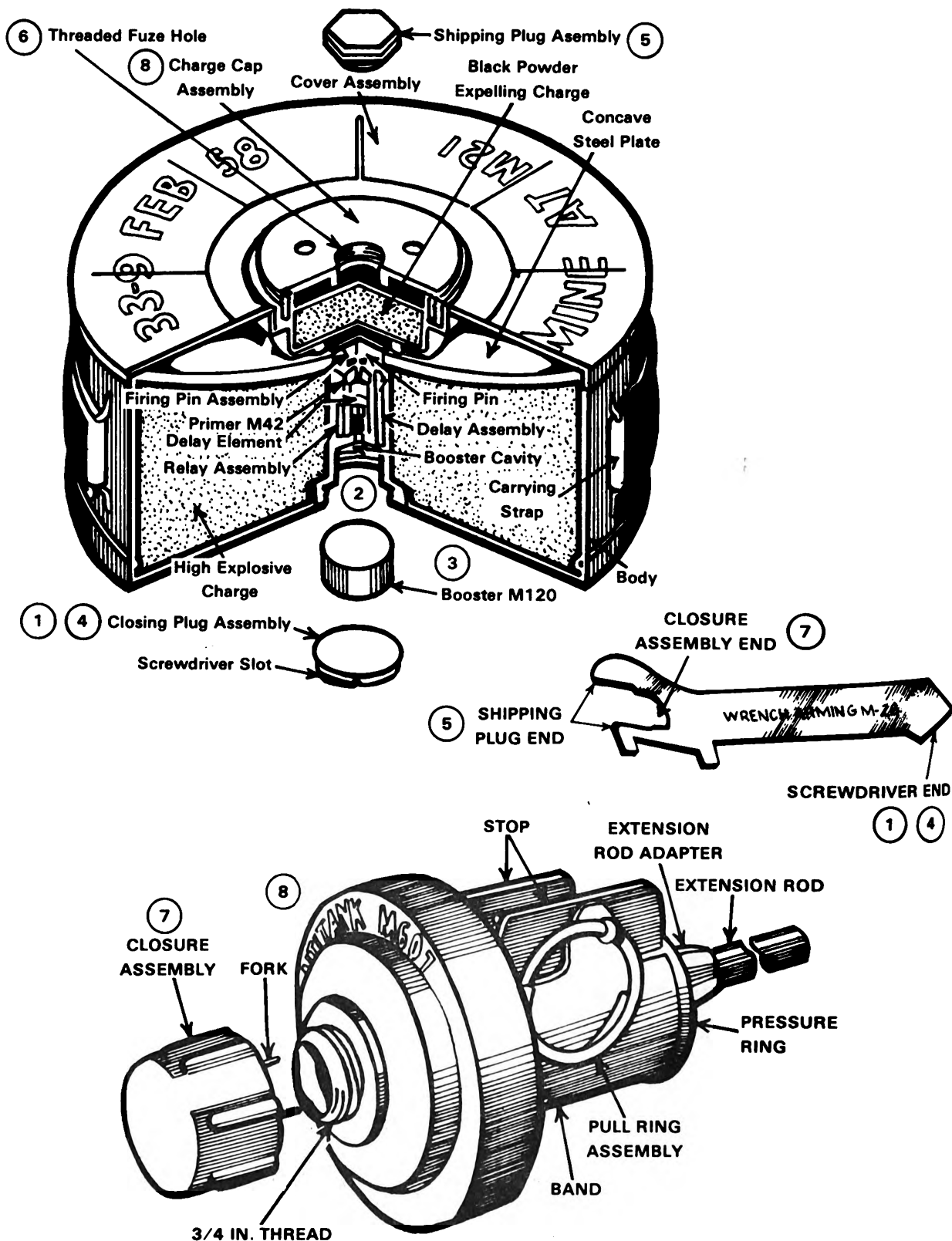


Figure 1.

2-IV-B-4.2

(4) With the M26 arming wrench, replace the closing plug assembly by turning clockwise until tight. The gasket of the closing plug assembly should be against the booster.

**NOTE: For long-term emplacement, coat the threads of the closing plug assembly with silicone grease DC 6, or equivalent.**

(5) Turn the mine bottom down, and using the shipping plug end of the M26 arming wrench, remove the shipping plug assembly from the fuze hole cavity of the mine.

(6) Inspect the fuze hole cavity and remove foreign material.

**NOTE: For long-term emplacement, coat the fuze threads with silicone grease also.**

(7) With closure end of the M26 arming wrench, remove the closure assembly from the M607 fuze. The gasket on the bottom of the fuze should remain in place.

(8) Screw the fuze handtight into the threaded fuze hole of mine charge cap.

### 3. To install the M21 AT mine:

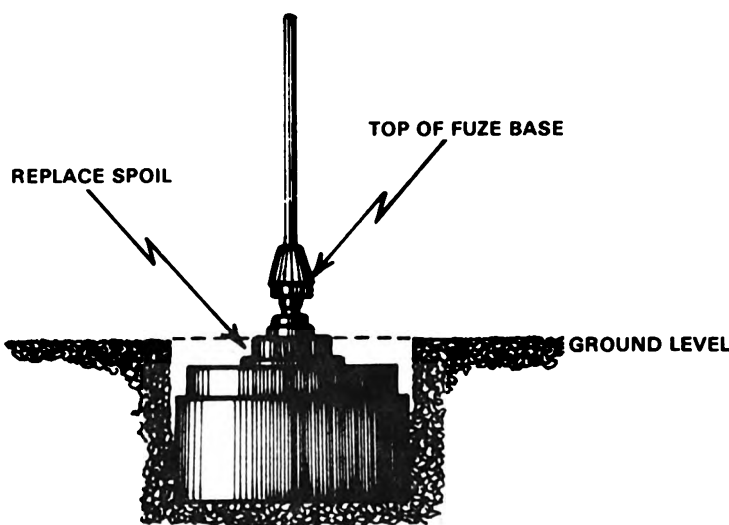
a. Dig the hole for the mine about 10 to 12 inches in diameter and about 6 inches deep.

b. Check the bottom of the hole to insure that the ground is solid. If the ground is soft, place a board or other flat object under the mine to provide a firm foundation.

c. Place the mine in the hole.

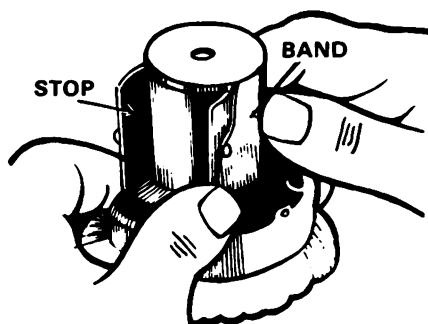
d. Press the ground firmly against the sides of the mine, leaving the fuze uncovered.

*Recommended burial for pressure fuze AT mines.*

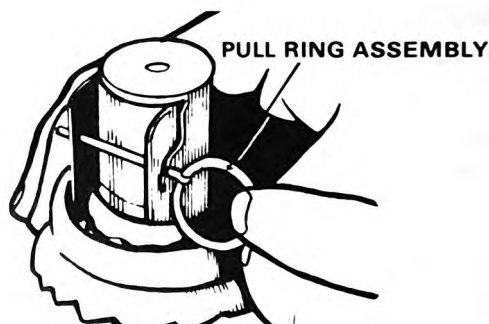


4. To arm the M21 AT mine:

- a. Remove pull ring assembly, band, and stop on the fuze. This arms the mine.



(A) BAND AND STOP IN PLACE



(B) PULL RING ASSEMBLY IN PLACE

- b. Retain the pull ring assembly, band, and stop for future use, if needed to disarm the mine.
- c. Camouflage the mine, using the spoil from the hole to cover the top of the mine with a 5-centimeter (2-inch) mound of earth, removing excess spoil and adding twigs, grass, or material natural to the surroundings.

5. To install the M21 AT mine, using the M607 fuze with tilt rod:

- a. Remove all components from the packing case.
- b. Follow the procedures in steps given in paragraph 3, above, until after you have pressed the ground firmly around the sides of the mine, leaving the fuze uncovered.
- c. Assemble the extension rod into the threaded pressure ring of the M607 fuze. (Extension rod adapters originally provided are not required.)
- d. Insure that the extension rod is vertical and not tilted in any direction.

**NOTE:** The use of the extension rod equipped with M607 fuze is preferable where the vegetation cover is sufficient to help conceal the extension rod.

- e. Camouflage of extension rods must be completed before the mine is armed.
- f. Remove the pull ring assembly, band, and stop on the fuze. This arms the mine.

**REFERENCES:**

FM 20-32, Mine/Countermine Operations at the Company Level, Nov 76 (app C, page 147, para C-11)  
 TM 9-1345-203-12&P, Land Mines (chap 2, para 2-10)  
 TEC Lesson 947-071-0184-F, Arming and disarming the M21 AT Mine  
 GTA 9-4-5, Mine AT M21

**TASK NUMBER: 051-192-1018**

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**DISARM THE M21 METALLIC ANTITANK MINE**

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**CONDITIONS:**

Under any environmental conditions, with an installed M21 metallic antitank mine, M26 arming wrench, and instructions to hand-neutralize the mine.

**STANDARDS:**

The mine will be disarmed and removed IAW the performance measures without detonating.

**PERFORMANCE MEASURES:**

**WARNING:** Before attempting to disarm and remove the mine, remove camouflage and check for any evidence of boobytrapping, damage, or malfunctioning. If any of these conditions are found to exist, do not attempt to disarm the mine.

1. To disarm the mine when equipped with an M607 fuze:
  - a. Replace safety (pull ring assembly, band, and stop).
  - b. Remove mine from hole.
  - c. Remove extension rod and adapter (if used).
  - d. Remove fuze.
  - e. Attach closure assembly to M607 fuze.
  - f. Remove the closing plug.
  - g. Remove M120 booster from bottom of mine.
  - h. Reinsert closing plug.

**REFERENCE:**

**TEC Lesson 947-071-0184-F, Arming and Disarming the M21 Antitank Mine**



## TASK NUMBER: 051-192-1002

# INSTALL THE M16A1 BOUNDING ANTIPERSONNEL MINE (WITH/WITHOUT TRIPWIRES)

## CONDITIONS:

Under any environmental conditions, with an M16A1 bounding antipersonnel mine, M605 fuze, M25 fuzing wrench, tripwire, and entrenching tool.

## STANDARDS:

The mine (with/without tripwire) will be installed IAW the performance measures so that detonation will occur as designed.

## PERFORMANCE MEASURES:

### 1. To install the mine without tripwires:

- a. First, inspect the mine (figure 1) to insure all parts are present.

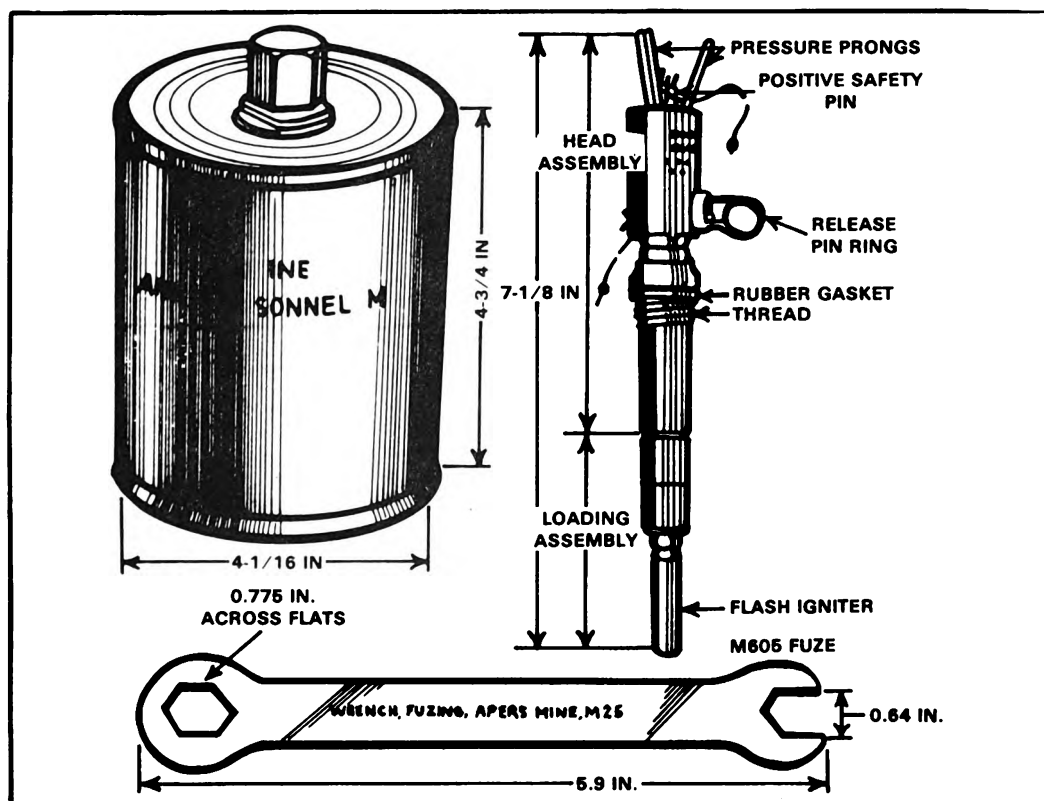


Figure 1.

2-IV-B-6.1

(1) Using the closed end of the fuzing wrench M25 issued with the mine, unscrew the shipping plug from the fuze well of the mine.

(2) Examine the fuze well and flash tube. To remove obstructions or foreign matter, turn the mine upside down and gently tap its bottom. If the mine appears to be damaged or in unsatisfactory condition, carry it to a safe place and destroy.

**b. Fuze the mine.**

(1) Carefully examine the M605 fuze assembly, including the crimping at the top of the fuze where it touches the top of the trigger, for evidence of damage. Check the safety pins to see that they move freely in the safety pin holes. Be sure the rubber gasket is around the fuze case.

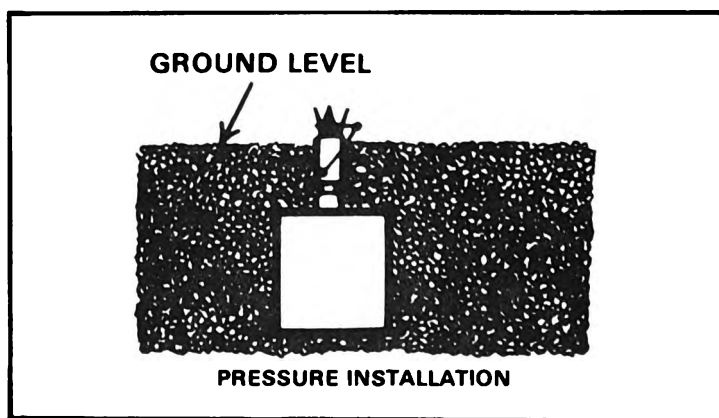
(2) Using the open end of the combination wrench M25, screw the fuze assembly into the fuze well of the mine and tighten it securely against the rubber gasket.

**c. Bury the mine.**

(1) Dig a hole about 6 inches deep and 5 inches in diameter.

(2) Place the mine in the hole.

(3) Cover the mine up to the bottom of the release pin ring with spoil from the hole, pressing it firmly into place around the sides of the mine (figure 2).



*Figure 2.*

(4) Leave the release-pin ring and pressure prongs exposed.

(5) Arrange the pull cords on the safety pins for easy withdrawal.

(6) Remove the locking safety pin. After the locking safety pin is removed, the interlocking pin, located between the prongs, can be removed from the positive safety pin.

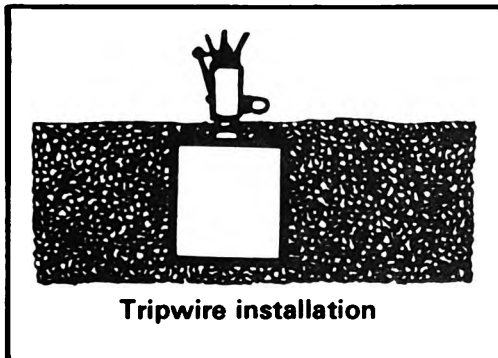
(7) Complete covering the mine with dirt until only the pressure prongs are above ground level. Camouflage the installation.



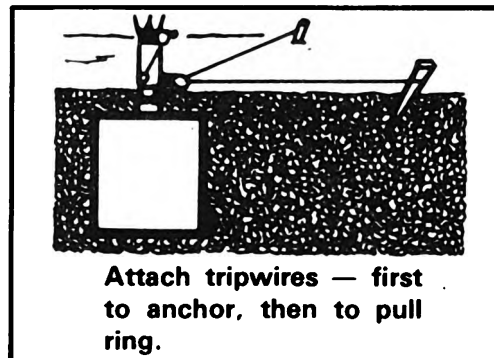
(8) Remove the positive safety pin, thus arming the fuze. If positive safety pin is hard to remove, obtain a new fuze.

## 2. To install the mine with tripwires:

- a. Inspect the mine. (See performance measure 1.)
- b. Fuze the mine. (See performance measure 1.)
- c. Bury the mine and install tripwires (figures 3 and 4).



*Figure 3.*



*Figure 4.*

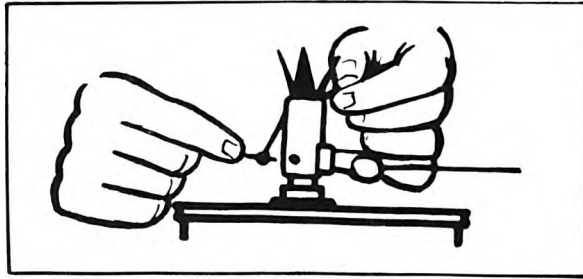
- (1) Dig a hole about 6 inches deep and 5 inches in diameter.
- (2) Lay the mine into the hole so that the tips of the prongs on the fuze will be just above ground.
- (3) Pack dirt tightly around and over the mine just below the release pin ring.
- (4) Install two anchor stakes approximately 10 meters from the mine. Locate the stakes so that the wires, when attached, will form a wide V. A third tripwire may be installed, if directed by the supervisor.
- (5) Fasten a separate wire to each anchor stake. Fasten the free ends to the release pin ring of the fuze.

**WARNING: DO NOT INSTALL THE TRIPWIRES SO TAUT THAT THEY EXERT PULL ON THE RELEASE PIN RING, AS THIS MIGHT CAUSE THE MINE TO DETONATE ACCIDENTALLY WHEN THE SAFETY PINS ARE REMOVED.**

- (6) Leave enough slack to the tripwires to allow the top of the fuze to rotate and receive a direct pull on the release pin ring from either of the tripwires.

## 3. To arm the mine (figure 5):

- a. Remove locking safety pin; then remove interlocking pin from the positive safety pin.



*Figure 5.*

- b. Arrange pull cords on positive safety for easy withdrawal.
- c. Camouflage the installation, being careful not to cover the pullcord on the positive safety pin.
- d. Arm the fuze by removing the positive safety pin. If positive safety pin is hard to remove, obtain a new fuze.

**REFERENCES:**

**FM 5-34, Engineer Field Data, Sep 76 (chap 3, page 41a)**  
**FM 20-32, Mine/Countermining Operations at the Company Level, Nov 76 (app C, page 143, para C-6)**  
**TM 9-1345-203-12 & P, Landmines, Jan 77 (chap 2, page 2-1, para 2-2)**

**TASK NUMBER: 051-192-1012**

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**DISARM THE M16A1 BOUNDING ANTIPERSONNEL  
MINE EQUIPPED WITH AND WITHOUT TRIPWIRES**

---

**CONDITIONS:**

Under any environmental conditions, given M16A1 bounding anti-personnel mines equipped with and without tripwires, M25 fuzing wrench, safety pins, and instructions to hand-neutralize the mines.

**STANDARDS:**

The mines will be disarmed and removed without detonating.

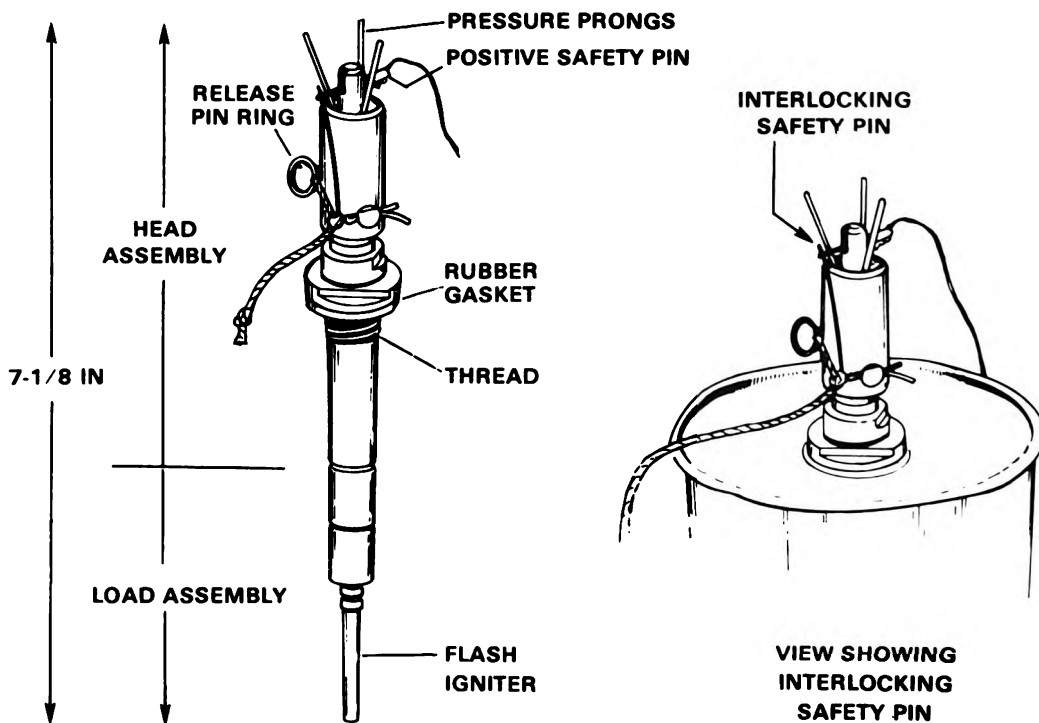
**PERFORMANCE MEASURES:**

**WARNING: BEFORE ATTEMPTING TO REMOVE THE MINE, REMOVE THE CAMOUFLAGE AND CHECK FOR EVIDENCE OF BOOBYTRAPPING, DAMAGE, MALFUNCTIONING, AND SAFETY PINS WHICH CANNOT BE REPLACED. IF SUCH FAULTS ARE APPARENT, DO NOT TRY TO DISARM THE MINE.**

1. To disarm a mine without tripwires.
  - a. After the mine has been checked, carefully uncover top of mine.
  - b. Carefully insert original safety pin, if available, or length of steel wire or a nail of proper diameter through the positive safety pin hole.
  - c. Insert safety pin, length of steel wire, or nail through the locking safety pin hole opposite the release pin ring.
  - d. Carefully dig around the sides and bottom of the mine, always being alert for boobytraps.
  - e. Carefully lift the mine from the hole.
  - f. Unscrew and remove the M605 fuze assembly, using the M25 wrench.
  - g. Replace the plastic shipping plug in the fuze well, and set the mine aside for disposition.
2. To disarm a mine equipped with tripwires.
  - a. Check mine and area for boobytraps. If clear, proceed.
  - b. Carefully uncover top of mine.
  - c. Examine mine for evidence of malfunction, damage, or tampering.

d. If mine does not appear to be damaged or tampered with, carefully insert original safety pin, if available, or length of steel wire or nail of proper diameter through positive safety pin hole.

e. Insert safety pin, length of steel wire, or nail through locking safety pin hole, opposite release pin ring.



f. After safeties have been inserted, cut all slack wires attached to the release pin ring.

g. Carefully dig around sides and bottom of mine, always being alert for boobytraps.

h. Lift mine from ground.

i. Unscrew and remove fuze assembly.

j. Replace plastic shipping plug in fuze well.

k. Restore mine and fuze to original condition, if possible.

## REFERENCES:

TM 9-1345-203-12&P, Land Mines, Jan 77 (chap 2, page 2-2, para 2-2)

TEC Lesson 947-071-0181-F, Disarm an M16A1 Antipersonnel Mine

**TASK NUMBER: 051-192-1021**

---

**LOCATE MINES BY VISUAL MEANS**

---

**CONDITIONS:**

During a daylight movement, with the possibility of enemy mines and boobytraps in an area, using visual sighting means only.

**STANDARDS:**

Mines will be located so that movement through the area will not detonate any mines.

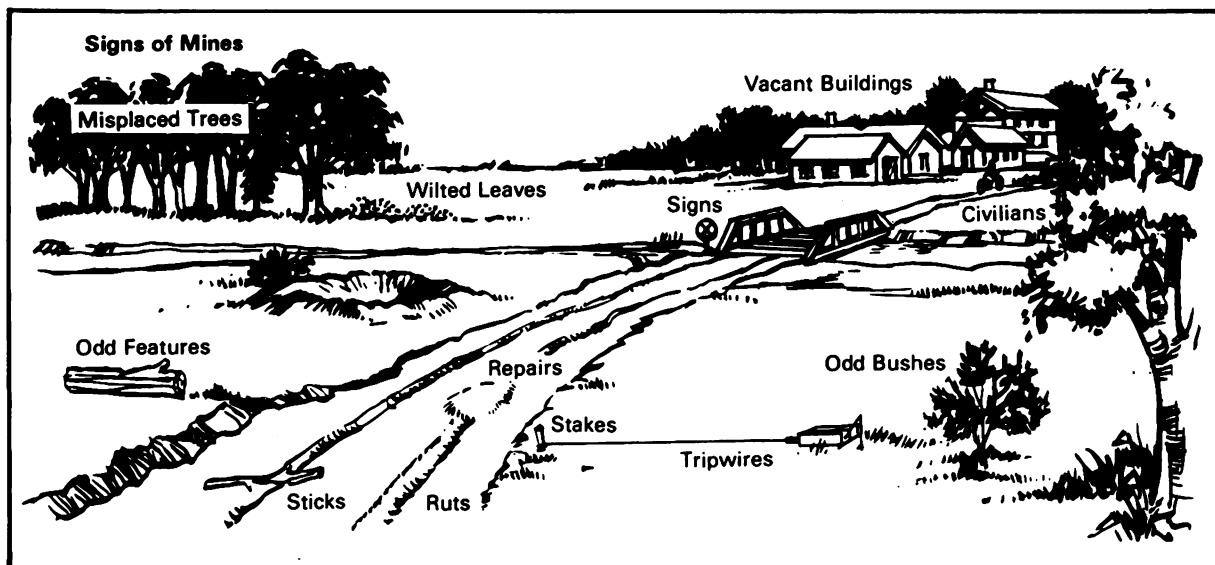
**PERFORMANCE MEASURES:**

The following techniques are recommended to detect mines and boobytraps:

1. Do not wear sunglasses.
2. Be alert for tripwires in these places:
  - a. Across trails.
  - b. On the shoulders of roads at likely ambush sites.
  - c. Near known or suspected AT or antivehicle mines.
  - d. Across the best route through dense plant growth.
  - e. In villages and on roads or paths into them.
  - f. In and around likely helicopter landing sites.
  - g. In approaches to enemy positions.
  - h. At bridges, fords, and ditches.
  - i. Across rice paddy dikes.
3. Look for mud smears, grass, sticks, dirt, dung, or other materials on roads.
4. Look for signs of road repair.
5. Watch for disturbed tire marks, ruts, or skid marks.
6. Be alert for any signs placed on trees, posts, or stakes.



## h. Odd features on the ground.



- i. Plant growth that has wilted or changed color.
  - j. Cover washed away by rain from pits and traps.
8. Watch the civilians - where they don't go.
  9. Be careful of enemy flags, banners, equipment, or supplies left behind.
  10. Watch for pieces of wood or other junk on a road.

**REFERENCE:**

**FM 20-32, Mine/Countermining Operations at the Company Level,**  
**Nov 76 (chap 13, sec I, pages 63 thru 66, para 13-2)**





**TASK NUMBER: 051-192-1022**

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**LOCATE MINES BY PROBING**

---

**CONDITIONS:**

Under any environmental conditions, given an area where mines and tripwires are installed, a nonmetallic probe, mine bonnets or other suitable marking device, and an assigned probing direction.

**STANDARDS:**

Locate and mark all mines without detonation.

**PERFORMANCE MEASURES:**

Probing is a way of detecting mines by piercing the earth with a sharp nonmetallic object, such as a sharp piece of wood. Metal probes should not be used. Probing is the best way to find buried mines but is slow, careful work, especially in hard or frozen ground.

**CAUTION: PRIOR TO PROBING, ITEMS SUCH AS HELMETS, BAYONETS, WEAPONS, AND WEB GEAR SHOULD BE REMOVED AND PLACED TO YOUR REAR. DOG TAGS AND JEWELRY SHOULD BE REMOVED AND PLACED IN EITHER POCKETS OR WEB GEAR PRIOR TO ENTERING, OR UPON BECOMING AWARE OF BEING IN, A MINED AREA. THIS INCREASES YOUR OVERALL SENSE OF TOUCH.**

**1. How to probe for mines:**

a. Roll up sleeves and remove items listed in the caution statement. Move on hands and knees, or crawl. Look and feel upward and forward to find tripwires and pressure prongs.

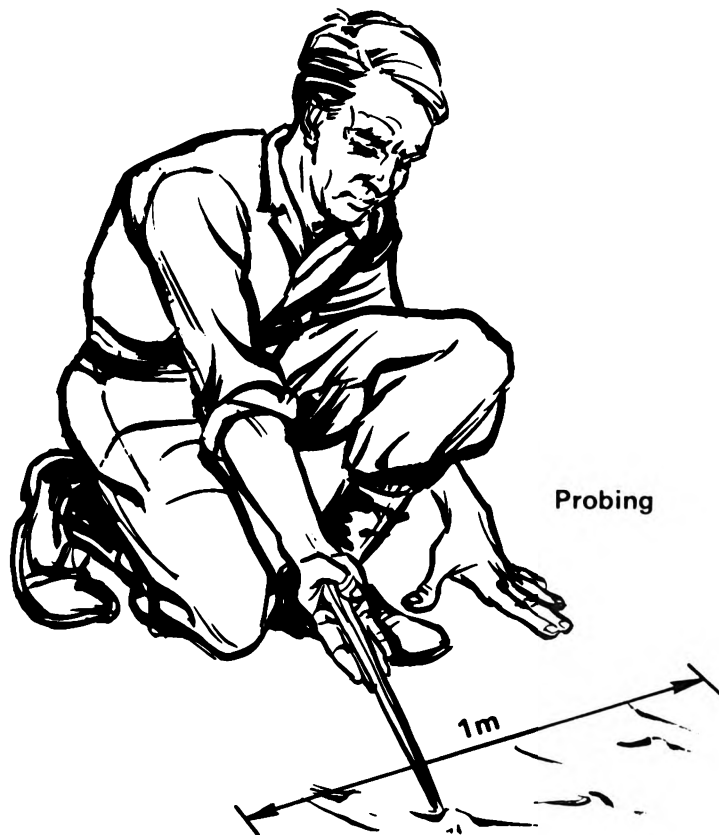
b. After looking and feeling, probe every 2 inches (5 centimeters) across a 1-meter front. Push the probe gently into the ground at an angle less than 45 degrees from the horizontal, putting just enough pressure on the probe to sink it slowly into the ground.

**CAUTION: IF PUSHED STRAIGHT DOWN, THE TIP OF THE PROBE MAY DETONATE A PRESSURE MINE.**

c. If the probe does not go into the ground freely, the soil must be picked or chipped away with the tip of the probe and the loose dirt removed by hand.

d. When a solid object is touched, stop probing and remove the earth to find out what the object is.

e. If a mine is found, remove enough earth to show what type of mine it is, then mark and report its exact location.



2. How to mark mines: During breaching operations where speed and silence are required, detected mines should be clearly marked (by placing a stick with cloth attached near the mine) so that friendly troops can safely bypass them without taking time to remove them.

**REFERENCE:**

**FM 20-32, Mine/Countermine Operations at the Company Level, Nov 76 (chap 13, page 67, para 13-3)**

**TASK NUMBER: 051-192-1501**

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**NEUTRALIZE ENEMY MINES**

---

**CONDITIONS:**

Given a field location with varied terrain, a (dummy) mine(s), 50-meter rope with grapnel, 1 pound of C4 or TNT, four blasting caps, 10 meters of time fuse, and incendiary material. Situation requires you to help clear mine(s).

**STANDARDS:**

The mine(s) will be detonated utilizing the following methods:

1. Hand-placed charges when access to the mine(s) can be gained.
2. Grapnels when engaging trip wire or tilt rod mines.
3. Vegetation fires only as a last resort to breach a minefield and when explosives and grapnels are not available.

**PERFORMANCE MEASURES:****1. Mine destruction, removal, and neutralization.**

a. Before a mine is destroyed or removed, traffic will be stopped. All personnel will be cleared to a safe distance of 300 meters.

b. With standard demolition procedures as referenced in FM 5-25, mines and boobytraps can be destroyed in place. A 1-pound block of TNT or 1-pound block of plastic explosive (C4) placed on top is enough to detonate a mine.

c. If it is decided that the mine must be removed, specially qualified soldiers should be tasked to remove it. This may be the case when the mine may damage a road, bridge, culvert, or civil structure to excess. Mines of special intelligence value may have to be removed for study instead of being destroyed in place.

d. If EOD personnel are not available, the mine may be removed by grappling hooks (grapnel) and rope from a protected position.

e. If the mine is detonated, check the crater for other mines. When the crater is clear, measure its size to learn the charge weight of the mine.

f. Safety.

(1) Flak jackets and steel helmets will be worn, with the exception of mine detector operators.

(2) Only one person will be allowed at the location of a suspected mine.

(3) All mines and explosive devices will be assumed to be equipped with antihandling devices until proven otherwise.

(4) All troops in the area will be cautioned not to run and to move only in areas previously cleared.

g. Personnel in a minefield will:

(1) Not divide responsibility (senior man is responsible for all actions).

(2) Not take chances.

**2. Use of Grapnels (figure 1). This is the safest method of destroying tripwire or tilt rod fuzed mines.**

a. Trip wire and tilt rod fuzed mines can be detonated by throwing a grapnel with rope attached and pulling it back to detonate the mines.

b. A 50-meter rope is attached to the grapnel for handthrowing; throw grapnels and rope past mine.

c. Cover should be sought before grapnel and rope touch the ground in the event that their impact may detonate the mine.

d. Pull grapnel back toward you while remaining in a protected position until the mine is detonated.

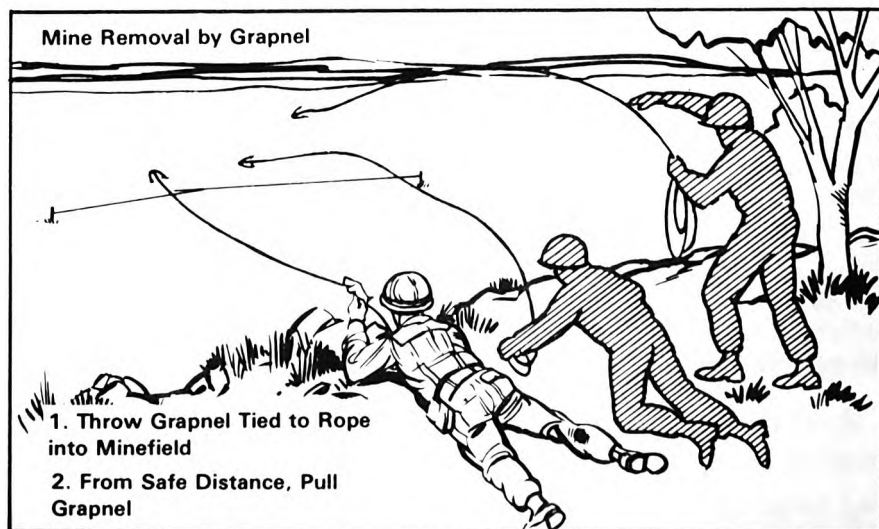


Figure 1.

**NOTE:** If the mine does not detonate after pulling it from its emplacement, wait 5 minutes before leaving cover and approaching the mine. The mine should then be destroyed by hand-placed charges.

### 3. Hand-Placed Charges (figure 2).

a. Procedures for priming demolitions for detonation are contained in tasks:

(1) Prime a demolition block nonelectrically.

(2) Prime a demolition block electrically.

(3) And in FM 5-25, chap 2.

b. A 1-pound charge of TNT, or C4, placed alongside or on top is sufficient to detonate one mine.

c. Prepare charge, and place alongside or on top of mine.

d. Light time fuse and move to safe position.

**NOTE:** Insure time fuse length will give you adequate time to return to protected position.



*Figure 2.*

### 4. Use of Rope (figure 3).

a. Prepare an A-frame and position it near the mine to be detonated.

b. Place a rope through the A-frame.

c. Extend the rope to a cleared, covered position, at least 50 meters from the mine.

d. Uncover only enough of the mine to expose a suitable part to which the end of the rope or a grapnel may be attached.

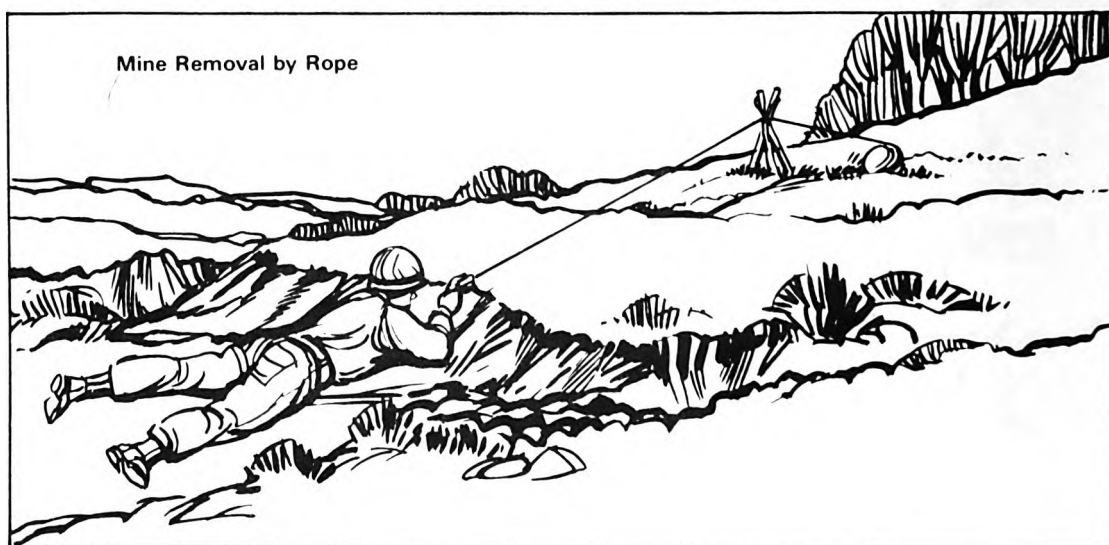
e. Tie the end of the rope to a hook or projection on the mine. If there is no projection, engage a hook of a grapnel under the bottom side of the mine opposite the direction of pull.

**NOTE:** Use care not to disturb the mine when uncovering and attaching grapnel or rope to the mine.

f. Move to the covered position and pull the mine from the hole.

**NOTE:** If no covered position is available, use an armored vehicle (if available) or lie prone behind a stump, tree or log or get in a ditch before attempting to pull the mine from the hole.

g. If the mine does not detonate, wait 5 minutes before leaving cover and approaching the mine. Then check the hole for additional mines.



*Figure 3.*

5. **Detonate by Burning.** Using incendiary material, set fire to the vegetation surrounding a mine (field) from the upwind side.

**NOTE:** This method is the least recommended method because it may not destroy all mines and those remaining must be located and marked; furthermore, these mines will be highly sensitive.

6. **Use of Weapons Fired Against Mines.** Engage mine from a protected position.

## REFERENCES:

FM 5-25, Explosives and Demolitions

FM 20-32, Mine/Countermining Operations at Company Level, Nov 76 (chap 18, page 99, para 18-8 and 18-10)

**TASK NUMBER: 051-193-1503**

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**CONSTRUCT A NONELECTRIC (INITIATION)  
DETONATING ASSEMBLY**

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**CONDITIONS:**

Under any environmental conditions, with time blasting fuse, nonelectric blasting cap, priming adapter, M60 or M2 weatherproof fuse igniter, and M2 cap crimpers.

**STANDARDS:**

The detonating assembly will be constructed IAW the performance measures and the nonelectric blasting cap will detonate when fired.

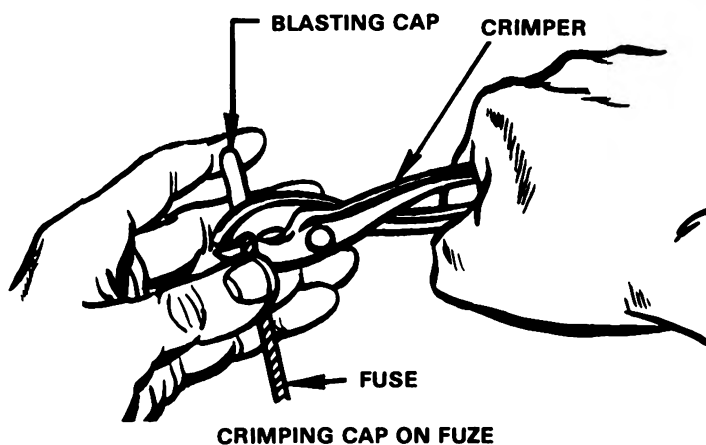
**PERFORMANCE MEASURES:**

1. Determine the length of time blasting fuse needed.
  - a. Cut and discard a 6-inch length from the free end of the time blasting fuse to prevent a misfire.
  - b. Cut a 3-foot length of time blasting fuse to check the burning rate.
    - (1) Light the fuse end using a fuse igniter, match, or lighter.
    - (2) Note the time it takes for the fuse to burn.
    - (3) Compute the burning rate per foot by dividing the time in seconds by the length in feet.
  - c. Cut the time blasting fuse long enough to permit the person detonating the charge to reach a safe distance by walking at a normal pace before the explosion. This cut should be made squarely across the time fuse.
2. Attach the blasting cap to the time blasting fuse.
  - a. Take one blasting cap from the cap box. Inspect it by looking into the open end. If any foreign matter or dirt is present, hold it with the open end down, and shake it gently or bump the hand holding it against the other hand.
    - (1) If foreign matter does not come out, discard cap.
    - (2) Never tap the cap with a hard object or against a hard object.
    - (3) Never blow into the cap.
    - (4) Do not insert anything into the cap to remove any dirt or foreign material.

b. Hold the time blasting fuse vertically with the square cut end up and slip the blasting cap gently down over it so that the flash charge in the cap is in contact with the end of the time fuse; if not in contact, it may misfire. Never force the time fuse into the blasting cap by twisting or any other method. If the end is flattened or it is too large to enter the blasting cap freely, roll it between the thumb and fingers until the size is reduced to permit free entry.

c. After the blasting cap has been seated, grasp the time blasting fuse between the thumb and third finger of the left/right hand and extend the forefinger over the end of the cap to hold it firmly against the end of the time fuse. Keep a slight pressure on the closed end of the cap with the forefinger.

d. Slide the second finger down the outer edge of the blasting cap to guide the crimpers, and thus obtain accurate crimping, even in darkness.



e. Crimp the blasting cap at a point  $\frac{1}{8}$  to  $\frac{1}{4}$  of an inch from the open end. A crimp too near the explosive in the blasting cap may cause detonation. Point the cap out and away from the body during crimping.





**NOTE:** If the blasting cap should remain in place several days before firing, protect the joint between the cap and the time blasting fuse with a coating of sealing compound or some similar substance. (As this standard-issue sealing compound does not make a waterproof seal, submerged charges should be fired immediately.)

3. Attach a priming adapter (used when available with a demolition block with threaded cap well).

a. Pass the end of the time blasting fuse through the priming adapter. (The time fuse should move through the adapter easily.)

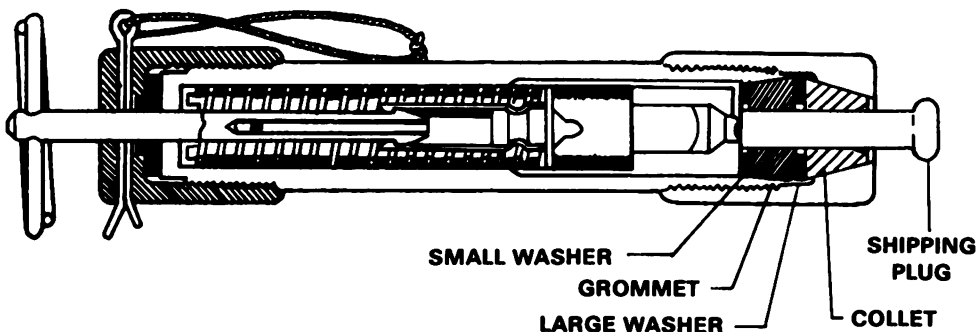
**NOTE:** For long lengths of time blasting fuse, it may be more convenient to pass the end of the fuse through the priming adapter before crimping the cap onto the time fuse.

4. Attach M60 weatherproof fuse igniter, if one is to be utilized.

a. Unscrew the fuse holder cap two or three turns but do not remove. Press the shipping plug into the igniter to release the split collet, and rotate the plug as it is removed.

b. Insert the free end of the time fuse in place of the plug until it rests against the primer.

c. Tighten the cap sufficiently to hold the fuse in place and thus weatherproof the joint.

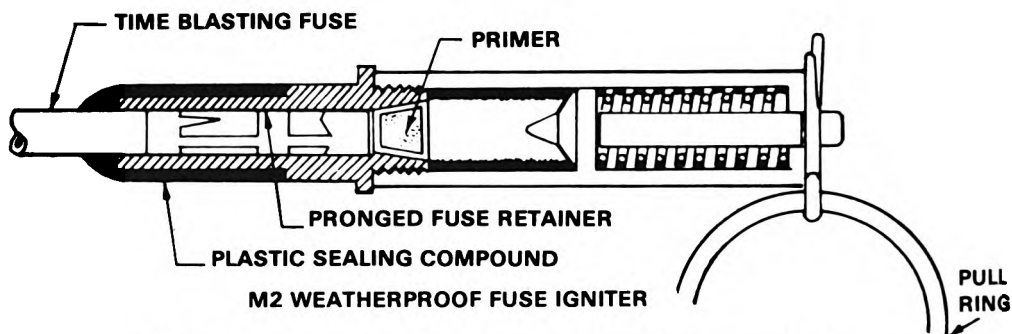


*M60 weatherproof fuse igniter.*

5. Attach M2 weatherproof fuse igniter, if one is to be utilized.

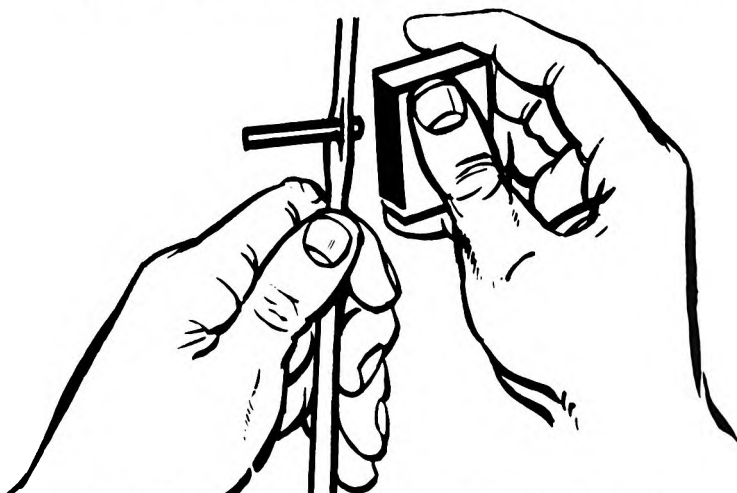
a. Slide the fuse retainer over the end of the fuse, firmly seating it, and apply sealing compound at the joint between the time blasting fuse and the igniter to protect the open end of the fuse from moisture.

b. This device was designed as a positive method of lighting time blasting fuse. It operates effectively under all weather conditions — even under water if it is properly waterproofed. A pull on the striker retaining pin causes the striker to hit the primer, igniting the fuse.

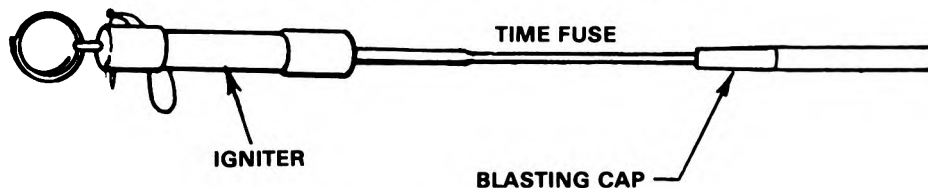


6. Construct expedient igniter if no standard lighter is available.

If a fuse igniter is not available, light the time blasting fuse with a match by splitting the fuse at the end, placing the head of an unlighted match in the powder train, and then light the inserted match head with a flaming match or by rubbing the abrasive on the match box against it.



7. The completed detonating assembly will look like this:



8. Warn personnel of the detonation.

- a. A warning will be issued to all personnel in the area to insure safety.
- b. The words "Fire in the hole" will be shouted loudly three times as the warning.

## REFERENCES:

FM 5-25, Explosives and Demolitions (chap 1, page 1-37, para 1-57m and 1-57n; chap 2, sec I, pages 2-1 thru 2-4)  
 TEC Lesson 645-093-7320-F, Prepare a Nonelectric Firing System  
 2-IV-C-1.4

**TASK NUMBER: 051-193-1003**

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**PRIME A DEMOLITION BLOCK NONELECTRICALLY**

---

**CONDITIONS:**

Under any environmental conditions, with a completed nonelectric detonating assembly (with and without a priming adapter), demolition blocks (with and without threaded cap well), an M2 crimper, and string.

**STANDARDS:**

The charge will be primed as follows:

1. Blasting cap will be inspected for foreign material.
2. Blasting cap/time fuse will be securely fastened to the demolition block.
3. The charge will detonate when fired.

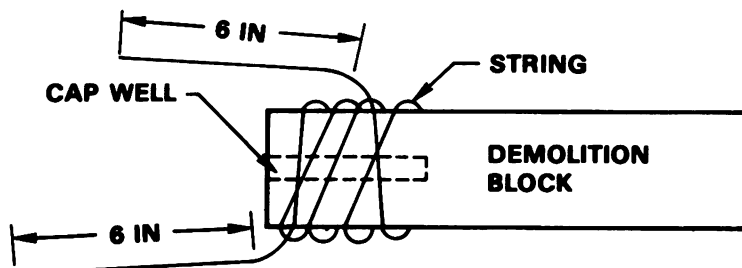
**PERFORMANCE MEASURES:**

1. Prime a demolition block with a threaded cap well and priming adapter available as follows:

- a. Inspect cap well for foreign material.
- b. Insert cap into cap well.
- c. Screw the adapter into the cap well.

2. Prime a demolition block with a threaded cap well and no priming adapter available as follows:

- a. Inspect cap well for foreign material.
- b. Wrap a string tightly around the demolition block and tie it securely, leaving about 6 inches of loose string on each end after making the tie.

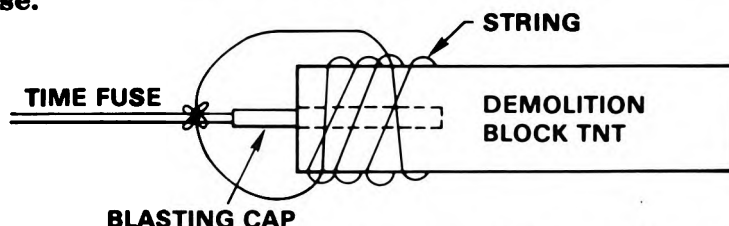


- c. Insert a blasting cap with fuse attached into the cap well.

**2-IV-C-2.1**

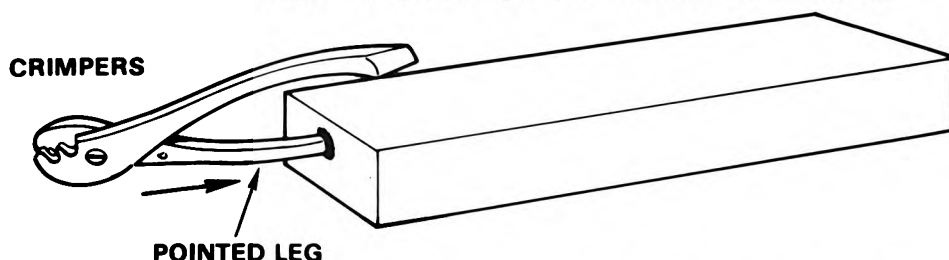
d. Tie the loose string around the fuse to prevent the blasting cap from being separated from the block.

**NOTE:** Do not tie the string so tight that powder train is broken in the fuse.

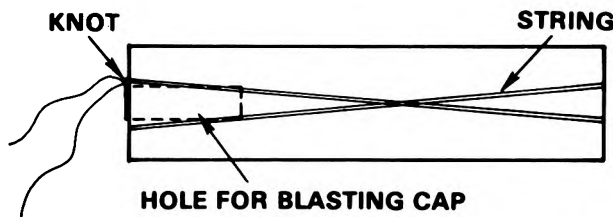


3. Prime a demolition block without threaded cap well as follows:

a. Make a hole in the end of the demolition block with the pointed handle on the M2 crimpers large enough to contain the blasting cap.

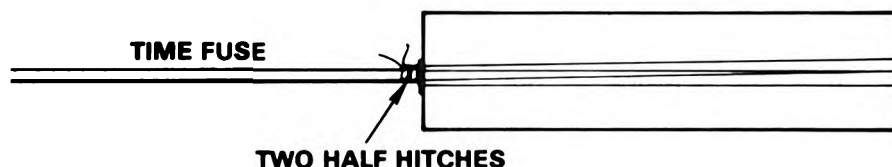


b. Using string, wrap several turns around the block and tie any knot. Position the tie so it will be at the top of the hole when the fused cap is inserted.



c. Insert fused cap into hole. (NOTE: Never try to force a cap into an expedient cap well that is too small to admit it easily. Remove cap and enlarge hole.)

d. Tie string around the time fuse at the top of hole with two half hitches.



## REFERENCE:

FM 5-25, Explosives and Demolitions, Feb 71 (chap 2, page 2-17, para 2-17)

**TASK NUMBER: 051-193-1004**

---

**CONSTRUCT AN ELECTRIC (INITIATION)  
DETONATING ASSEMBLY**

---

**CONDITIONS:**

Under any environmental conditions (except for electrical storms, in the vicinity of FM radio transmissions, or other static electricity outputs that could detonate electric blasting caps), with firing wire, electric blasting caps, an M51 blasting cap test set or a blasting galvanometer, and a blasting machine.

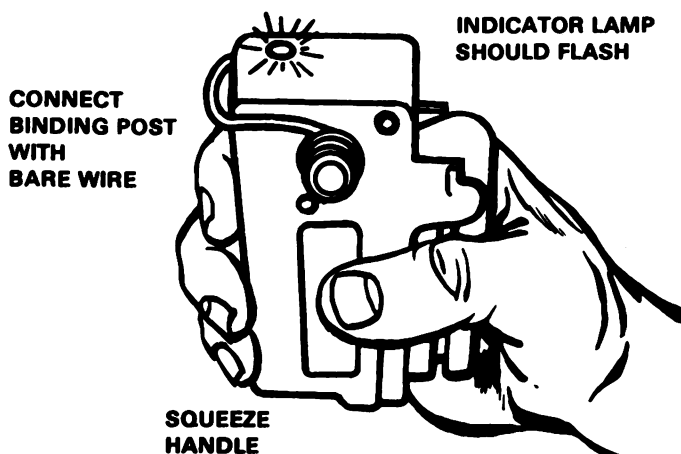
**STANDARDS:**

Construct the detonating assembly IAW the performance measures below in such a manner that the electric blasting cap will detonate when fired.

**PERFORMANCE MEASURES:**

1. Check test equipment (M51 blasting cap test set or galvanometer), firing wire, and blasting cap.

a. To check M51 blasting cap test set, connect the binding posts with a piece of bare wire. The indicator lamp should flash when the handle is squeezed.



*Figure 1.*

b. To check the firing wire (using M51 test set):

(1) Separate the firing wire conductors at both ends, and connect those at one end to the test set binding posts. Actuate test set. The indicator lamp should not flash. If it does, the firing wire has a short circuit (figure 2a).

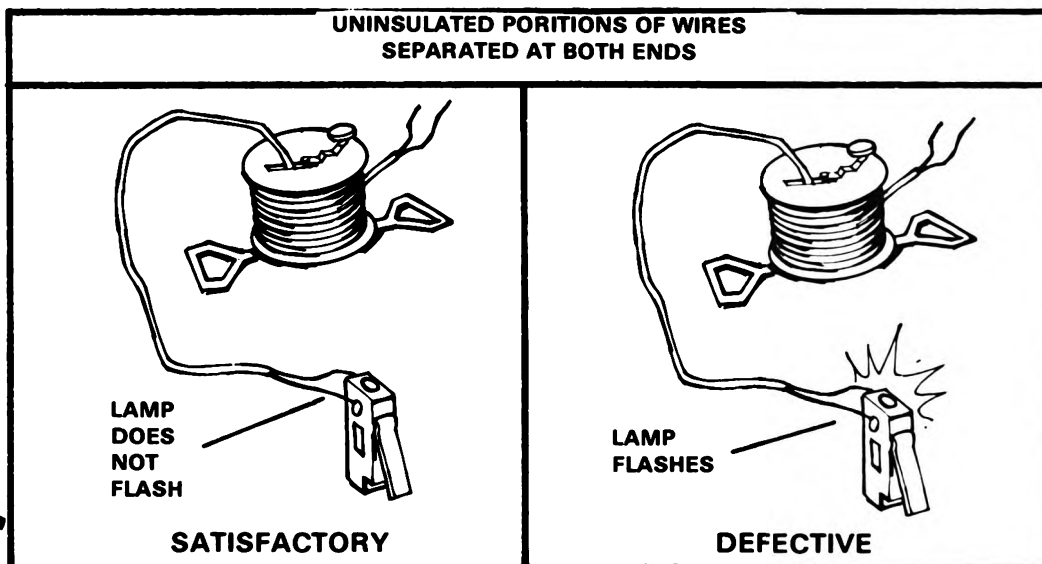


Figure 2a.

(2) Twist the wires together at one end, and connect those at the other end to the test set posts. Actuate test set. The indicator lamp should flash. If it does not flash, the firing wire has a break (figure 2b).

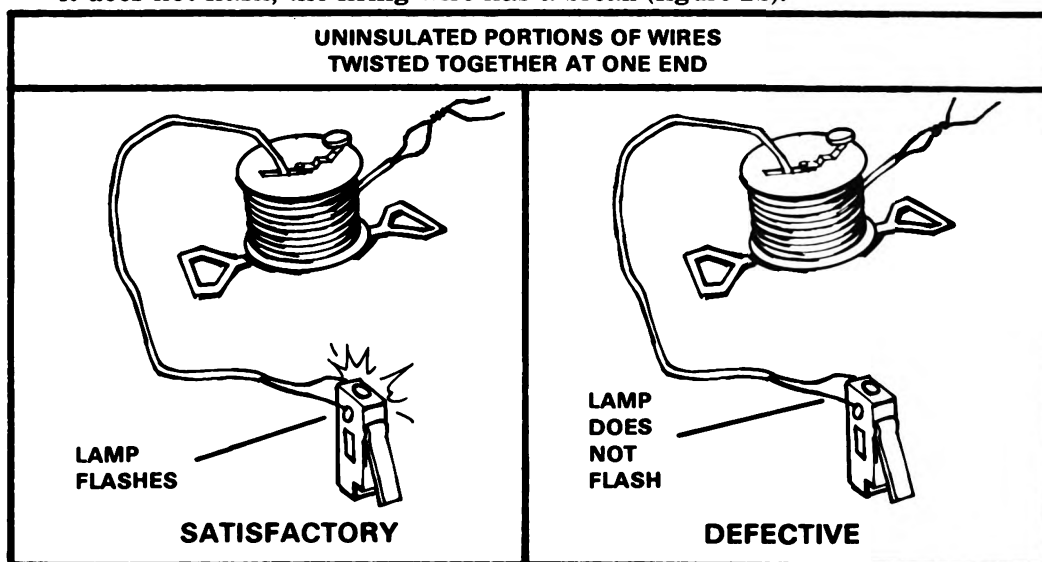


Figure 2b.

c. To check the blasting galvanometer, hold a piece of metal across its terminals. If the battery is good, this should show a wide deflection of the needle, approximately 25 units (zero ohms) (figure 3).

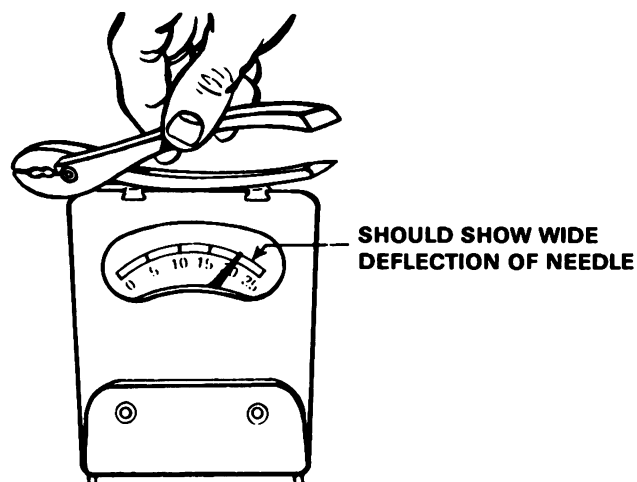


Figure 3.

d. To check the firing wire (using the blasting galvanometer):

(1) Separate the firing wire conductors at both ends, and touch those at one end to the galvanometer posts. The needle should not move. If it does, the firing wire has a short circuit (figure 4a).

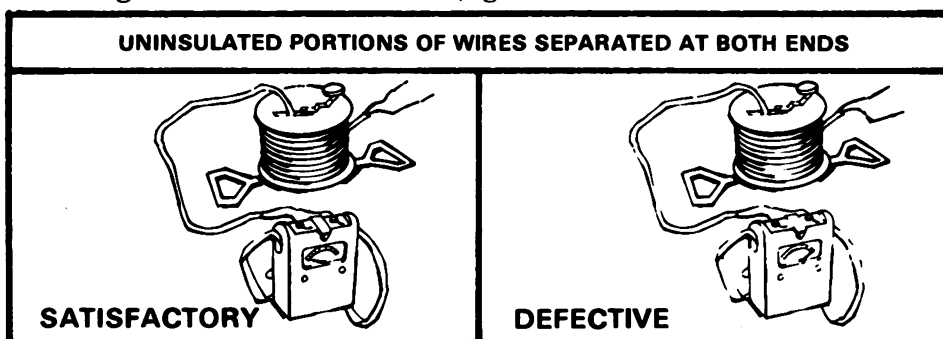


Figure 4a.

(2) Twist the wires together at one end and touch those at the other end to the galvanometer posts. This should cause a wide deflection of the needle (about  $1\frac{1}{2}$  ohms or 23 to 24 units for a 500-foot length). No movement of the needle indicates a break; a slight movement indicates a point of high resistance which may be caused by a dirty wire, loose wire connection, or wires with several strands broken off at connections (figure 4b).

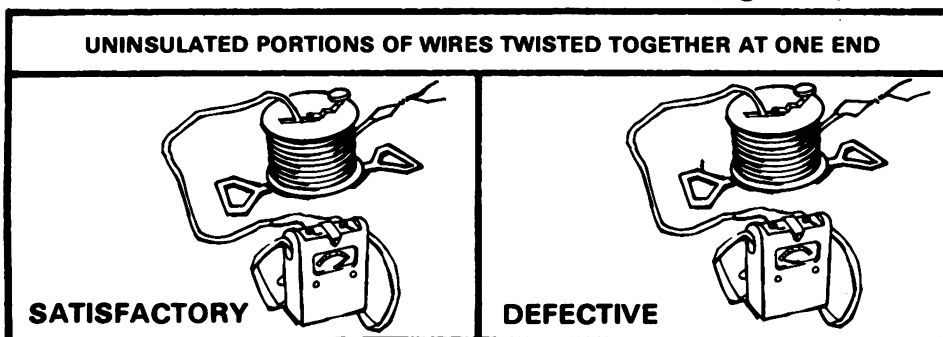


Figure 4b.

**NOTE: Firing wire may be tested on the reel, but should be tested again after unreeling, which may separate broken wires unnoticed when reeled.**

(3) Twist the free ends of the firing wire together to prevent an electric charge from building up in the firing wire.

e. Test each blasting cap to be used in the electric firing system.

(1) When using the M51 blasting cap test set:

(a) Check the test set as described in para 1a.

(b) Remove the short circuit shunt from the lead wires of the electric blasting cap.

(c) Attach one cap lead wire to one binding post and tie other cap lead wire to the other post, and squeeze the test set handle. If the indicator lamp flashes, the blasting cap is satisfactory. If it does not flash, the cap is defective and should not be used. During the test, always point the explosive end of the blasting cap away from the body.

(2) When using the blasting galvanometer:

(a) Check the galvanometer as described in para 1c.

(b) Remove the short circuit shunt.

(c) Touch one cap lead wire to one galvanometer post and the other cap lead wire to the other. If the galvanometer's needle deflects slightly less than it did when instrument was tested, the blasting cap is satisfactory; if not, the cap is defective and should not be used. During the test, always point the explosive end of the cap away from the body.

**NOTE: If the battery is fresh, the galvanometer should read 25 units (zero ohms) when the instrument is tested and about 24 units (about 2 ohms) when a good blasting cap is tested.**

(3) After each cap has been tested, twist the free ends of the cap lead wires together or shunt them with the short circuit shunt provided to prevent an electric charge from building up in the cap lead wires.

## **2. Construction of the detonating assembly:**

a. Lay out firing wire from demolition site to the firing position.

(1) Retest wire using the M51 test set or blasting galvanometer as described in para 1.

(2) Twist the free ends of the firing wire together to prevent an electric charge from building up in the firing wire.

b. Move to the demolition pit or site.



**NOTE: Blasting machine should be kept in possession of the firer or in a secure location to prevent premature connection to the firing wire.**

### **3. Connect series circuit.**

a. If two or more electric blasting caps are used, connect their lead wires into one of the two series circuits described in TASK NUMBER: 051-193-1006, **Connect electrical firing circuits.**

b. If more than 10 blasting caps are used in the series circuit, or if the circuit is complicated, it should be tested with the test set or galvanometer.

c. Splice the free cap lead wires to the firing wire.

**4. Insert caps into charges. (See TASK NUMBER 051-193-1005, Prime demolition block electrically.)**

### **5. Test entire circuit.**

a. Move to the firing position and test the entire firing circuit with the test set or galvanometer.

b. When using the blasting cap test set, connect the free ends of the firing wire to the binding posts. The indicator lamp should flash. If the lamp does not flash, the circuit is defective.

**NOTE: Since the M51 test set cannot discriminate between a firing circuit that is properly set up and one with a short in it, special care must be taken in wiring the circuit to avoid shorting.**

c. When using the galvanometer, touch the free ends of the firing wire to the galvanometer posts. This should cause a wide deflection of the needle. The magnitude of the deflection depends upon the number of caps and the length of the firing wire. If there is no deflection, the circuit is defective.

**NOTE: To get a "wide deflection of the needle," the galvanometer battery should be in good condition.**

d. If the firing circuit is defective, shunt wires. Then go down range and recheck the circuit. If a splice is found defective, resplice the wires. If a cap is found defective, replace it. Continue to test all caps and wires in the circuit, then test the entire circuit again to make sure that all breaks have been located before attempting to fire the charge.

e. Twist the free ends of the firing wire together.

**6. Test operate blasting machine.** Test operate the blasting machine several times to insure that it operates properly.

**7. Connect the blasting machine.** Untwist the free ends of the firing wire and fasten them to the two posts of the blasting machine.

**8. Special precautions.**

a. If two or more electric blasting caps are connected in the same circuit, be sure that they are of the same type and made by the same manufacturer. This is essential to prevent misfires, as blasting caps of different manufacturers have different electrical characteristics which can result in some caps in the circuit not firing because others fire more quickly and thus break the circuit before the slower caps have received enough electricity to fire. This is not true, however, of the M6 special electric blasting caps — all of which are made according to the same specifications. Blasting caps of the same manufacturer may be identified by the label, color of the cap, or shape of the shunt.

**REFERENCES:**

**FM 5-25, Explosives and Demolitions, Feb 71 (chap 2, pages 2-4 thru 2-11, para 2-4 thru 2-9)**  
**TEC Lesson 645-093-7321-F, Prepare Electric Firing System**

**TASK NUMBER: 051-193-1005****PRIME DEMOLITION BLOCK ELECTRICALLY****CONDITIONS:**

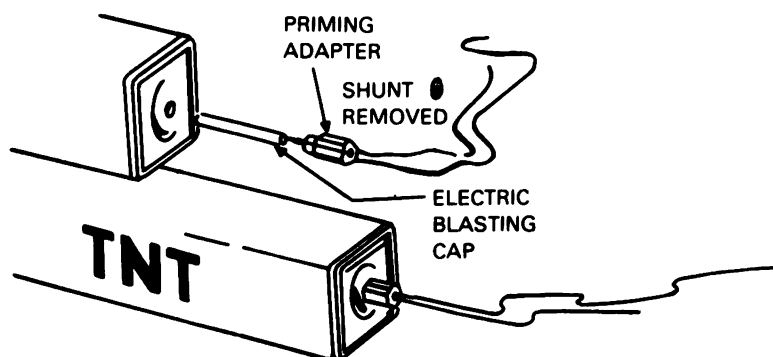
Under any environmental conditions (except for electrical storms, in the vicinity of FM radio transmissions, or other static electricity outputs that could detonate electric blasting caps), with firing wire, tested electric blasting caps, priming adapter, demolition blocks (with and without threaded cap well), and M2 crimper.

**STANDARDS:**

The charge will be primed IAW performance measures so that it detonates when fired.

**PERFORMANCE MEASURES:**

1. To prime a demolition block with a threaded cap well and priming adapter available (figure 1):
  - a. Inspect cap well for foreign material.
  - b. Untwist the free ends of the lead wire and fasten them to the firing wire.
  - c. Pass the lead wires through the slot of the adapter and pull the cap into place in the adapter.
  - d. Insert the cap into the cap well of the block and screw the adapter into place.



*Figure 1.*

2-IV-C-4.1

2. To prime a demolition block with a threaded cap well and no priming adapter available (figure 2):

- a. Inspect cap well for foreign material.
- b. Untwist the free ends of the lead wire and fasten them to the firing wire.
- c. Insert the electric cap into the cap well and tie the lead wires around the block with two half hitches or a girth hitch. Allow some slack in the wires between the blasting cap and the tie to prevent any pull on the blasting cap.

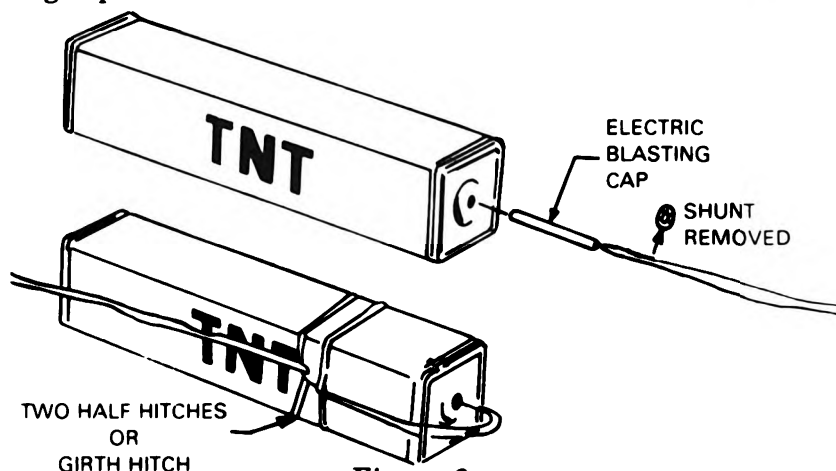


Figure 2.

3. To prime a demolition block without a threaded cap well (figure 3):

- a. Make a hole in the end of the demolition block with a pointed nonsparking instrument or the pointed handle on the M2 crimpers large enough to contain the blasting cap.
- b. Follow steps in performance measure 2. (NOTE: Never try to force a cap into an expedient cap well that is too small to admit it easily. Remove cap and enlarge hole.)

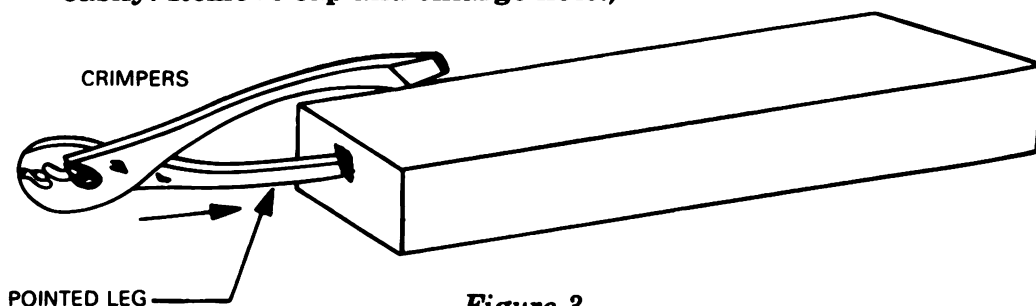


Figure 3.

## REFERENCES:

FM 5-25, Explosives and Demolition, Feb 71 (chap 2, page 2-19, para 2-18b)  
 TEC Lesson 645-093-7321-F, Prepare Electric Firing System

## TASK NUMBER: 051-193-1006

## CONNECT ELECTRICAL FIRING CIRCUITS

## CONDITIONS:

Under any environmental conditions (except for electrical storms, in the vicinity of FM radio transmissions, or other static electricity outputs that could detonate electric blasting caps), with prepared electrically primed charges and appropriate demolition tools and equipment, using prescribed splicing methods.

## STANDARDS:

Every charge in the series circuit will detonate when the circuit is fired.

## PERFORMANCE MEASURES:

## 1. Splice firing wire (figure 1).

a. Insulated wires, before splicing, must have the insulating material stripped from the ends. Expose about 3 inches of bare wire and remove any foreign matter such as enamel by carefully scraping the wire with the back of a knife blade or other suitable tools. The wires should not be nicked, cut, or weakened when the wires are pared, and multiple strand wires should be twisted lightly after scraping.

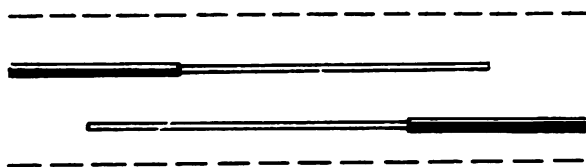


Figure 1.

## b. Splicing method (figure 2).

(1) Two wires, which have been prepared as described above, may be spliced as shown. This is called the Western Union "pigtail" splice. Two pairs of wires are spliced in the same manner as the two wire splice. One wire of one pair is spliced to one wire of the other pair, and the process is repeated for the other two wires.



Figure 2.

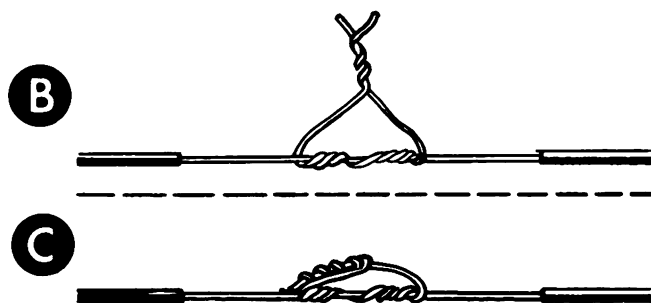


Figure 2 (cont).

*Splicing two wires (Western Union "pigtail" splice).*

c. A short circuit may very easily occur at a splice if certain precautions are not observed.

(1) If pairs of wires are spliced, stagger the two separate splices and tie with twine or tape (figure 3).



Figure 3.

(2) An alternate method of preventing a short circuit is when the splices are separated, not staggered (figure 4).

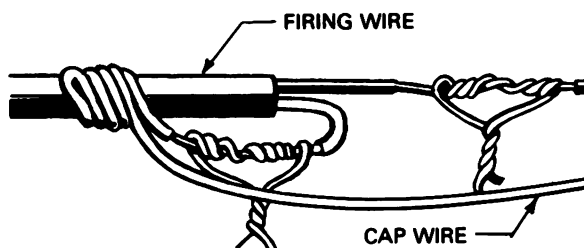


Figure 4.

(3) Whenever possible, insulate splices from the ground or other conductors by wrapping them with friction tape or other electrical insulating tape. This is particularly necessary when splices are placed under wet tamping. Circuit splices, not taped or insulated, should not lie on moist ground. The splices should be supported on rocks, blocks, or sticks so that only the insulated portions of the wires touch the ground. They may also be protected by inserting them into cardboard cap spools which may be bent to hold the splice firmly inside.

(4) Splices may be protected from damage from pull by tying the ends in an overhand or square knot, allowing sufficient length for each splice (figure 5).

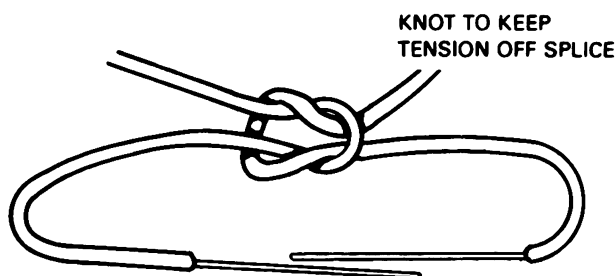


Figure 5.

**Specific Reference:** FM 5-25, chap 2, para 2-5, fig 2-5, 2-6.

d. Series circuits (figure 6).

(1) Common series is used for connecting two or more charges fired electrically by a single blasting machine. A common series circuit is prepared by connecting one blasting cap lead wire from the first charge to one lead wire in the second charge and so on until only two end wires are free, then connecting the free ends of the cap lead wires to the ends of firing wire. Connecting wires (usually annunciator wire) are used when the distance between blasting caps is greater than the length of the usual cap lead wires (figure 6a).

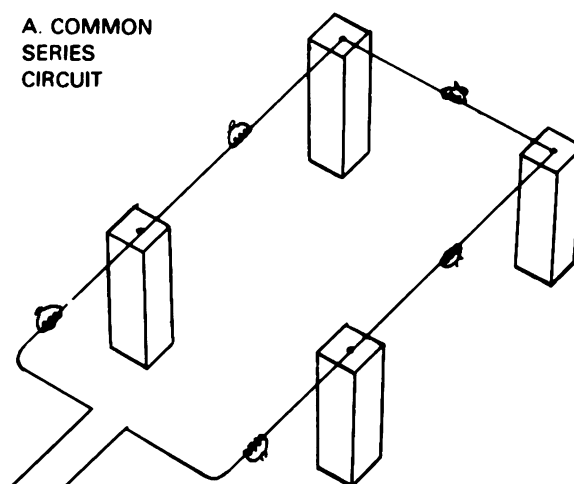
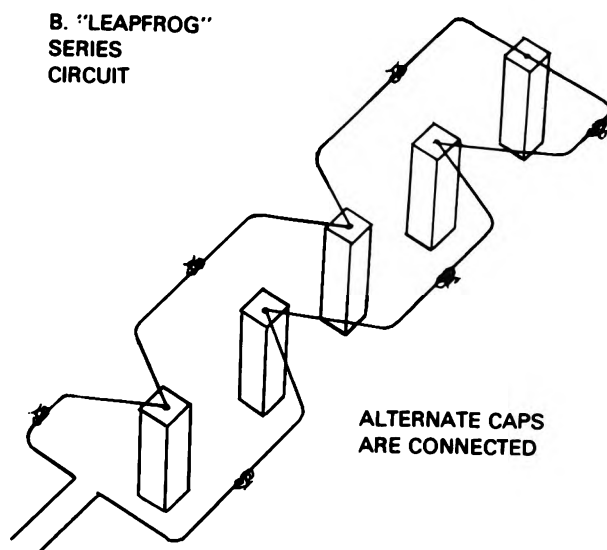


Figure 6a.

(2) Leapfrog series is useful for firing ditching charges or any long line of charges. It consists of omitting alternate charges on the way and then connecting them to form a return path for the electric impulse to reach the other lead by the firing wire. This brings both end wires out at the same end of the line of charges, and thus eliminates laying a long return lead from the far end of the line of charges back to the firing wire (figure 6b).



*Figure 6b.*

**Specific Reference: FM 5-25, chap 2, para 2-6, fig 2-7.**

**REFERENCE:**

**FM 5-25, Explosives and Demolitions, Feb 71 (chap 2, pages 2-6 thru 2-7, para 2-5 and 2-6)**



## TASK NUMBER: 051-193-1010

## INSTALL FIRING DEVICES ON STANDARD MILITARY EXPLOSIVES

### CONDITIONS:

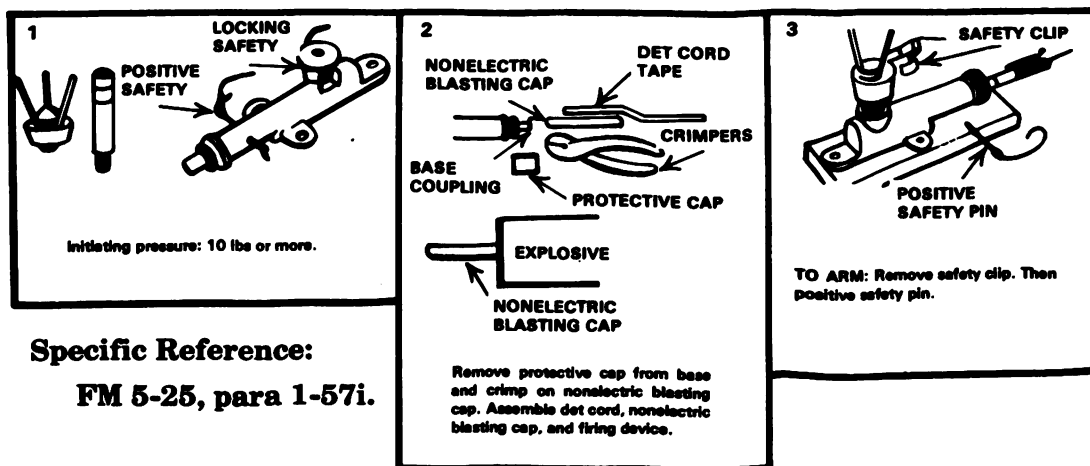
Under any environmental conditions with demolition charges (with or without cap well), M1A1 pressure firing device, M1 pull firing device, M3 pull release firing device, M5 pressure release firing device, nonelectric blasting caps, and M2 crimpers.

### STANDARDS:

Without causing premature detonation, each firing device will be installed on demolition charges so that the device will detonate the charge as designed.

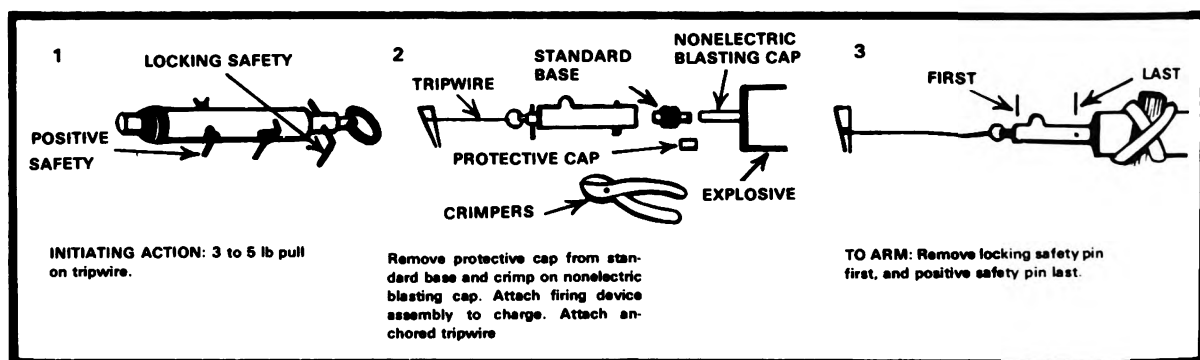
### PERFORMANCE MEASURES:

1. To install an M1A1 pressure firing device (figure 1).
  - a. Remove protective cap from base and crimp on a nonelectric blasting cap. (Crimper jaws should be placed no further than 1/4 inch from the open end of the blasting cap.)
  - b. Assemble three-pronged pressure head and extension rod if needed, and screw in top of pressure cap.
  - c. Attach firing device assembly to demolition charge.
  - d. Remove safety clip first and positive safety pin last.



*Figure 1. M1A1 pressure firing device.*

2. To install an M1 pull firing device (figure 2).
  - a. Remove protective cap.
  - b. With crimpers, attach nonelectric blasting cap to standard base. (Crimper jaws should be placed no further than 1/4 inch from the open end of the blasting cap.)
  - c. Attach firing device assembly to demolition charge.
  - d. Anchor one end of tripwire to stake and fasten other to pull ring.
  - e. Remove locking safety pin first and positive safety pin last.

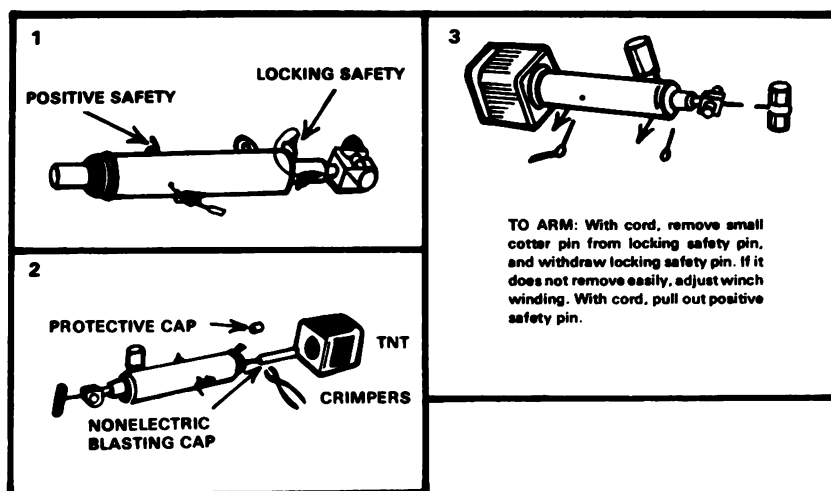


*Figure 2. M1 pull firing device.*

**Specific Reference:** FM 5-25, para 1-57j.

3. To install an M3 pull-release firing device (figure 3).
  - a. Remove protective cap.
  - b. With crimpers, attach nonelectric blasting cap to standard base. (Crimper jaws should be placed no further than 1/4 inch from the open end of the blasting cap.)
  - c. Attach firing device to anchored charge (must be firm enough to withstand a pull of at least 20 pounds).
  - d. Attach one end of pull wire to an anchor and place the other end in the hole in the winch.
  - e. With knurled knob, draw up tripwire until locking safety pin is pulled into the wide portion of the safety pin hole.
  - f. Remove locking safety pin first and positive safety pin last.

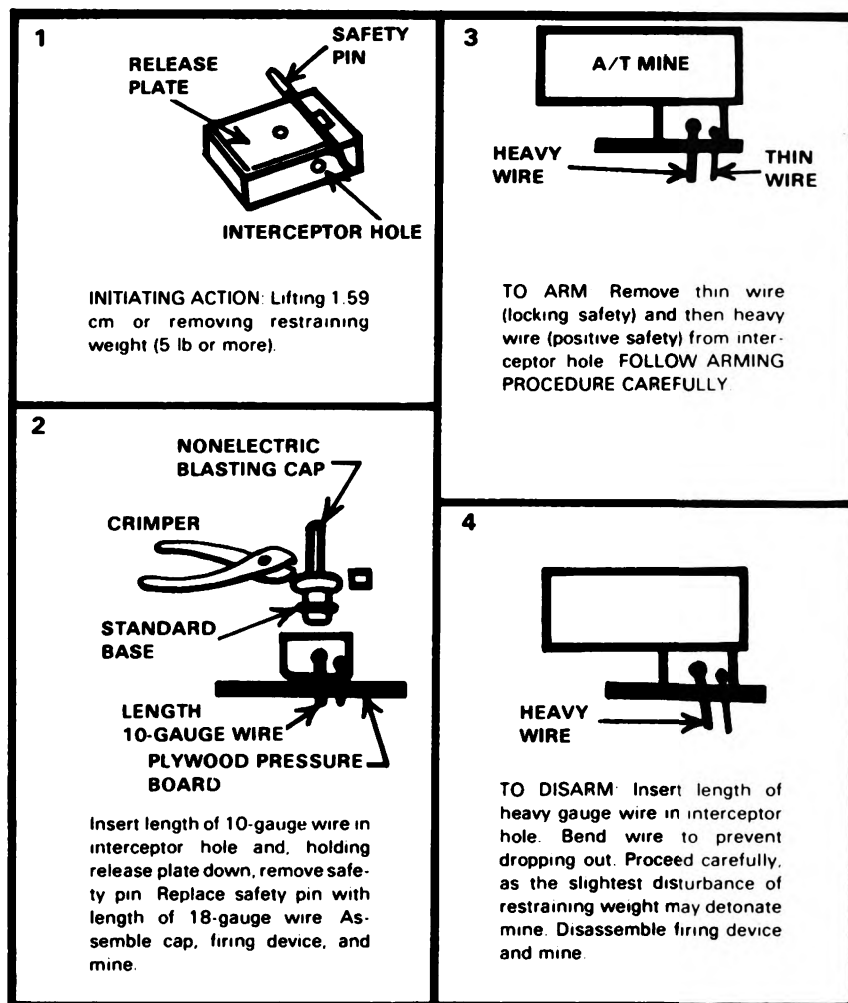
**WARNING:** Do not attempt to hand-neutralize the M3 firing device for recovery. Boobytraps utilizing M3 firing devices must be neutralized by detonating in place.



*Figure 3. M3 pull release firing device.*

**Specific Reference: FM 5-25, para 1-57k.**

4. To install an M5 pressure-release firing device (figure 4).
  - a. Insert a length of 10-gauge wire into interceptor hole.
  - b. Bend the 10-gauge wire slightly to prevent it from dropping out.
  - c. Remove the small cotter pin from the safety pin.
  - d. Holding release plate down, replace the locking safety pin with a length of 16- or 18-gauge wire. Bend the wire slightly to prevent it from dropping out.
  - e. Remove protective cap from base and, with crimpers, attach the nonelectric blasting cap. (Crimper jaw should be placed no further than 1/4 inch from open end of blasting cap.)
  - f. Secure the firing device assembly in demolition charge or explosive device.
  - g. Emplace charge and firing assembly in a predesignated location using the pressure board to insure a solid foundation for the firing device.
  - h. Place a restraining weight of at least 5 pounds onto the firing device release plate.
  - i. Remove the improvised locking safety pin first and then the improvised positive safety pin from the interceptor hole. The pins should remove easily if the restraining weight is adequate and positioned properly.



*Figure 4. M5 pressure-release firing device.*

**Specific Reference:** FM 5-25, para 1-571.

**REFERENCES:**

**FM 5-25, Explosives and Demolitions, Feb 71**

## TASK NUMBER: 051-193-1501

## PREPARE AND DETONATE EXPLOSIVES USING DETONATING CORD

**CONDITIONS:**

Under any environmental conditions, with designated explosives, detonating cord, and appropriate demolition tools and equipment.

**STANDARDS:**

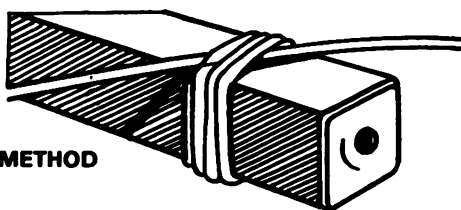
The charge will be primed IAW the performance measures so that it detonates when fired.

**PERFORMANCE MEASURES:****1. To prime demolition blocks:**

a. The method which offers the greatest assurance of detonation is to fix a nonelectric blasting cap to the end of the detonating cord and place it in the demolition block similar to nonelectric priming methods.

b. The common method is to lay one end of a 4-foot length of detonating cord at an angle across the explosive. The running end is then given three wraps around the block and the end laid at an angle. On the fourth wrap, slip the running end under all wraps parallel to the other end and draw tight.

COMMON METHOD

**2. To prime plastic explosives:**

a. When priming explosives with detonating cord, form either the (a) overhand, (b) triple roll, or (c) Uli knot.



(a) OVERHAND KNOT



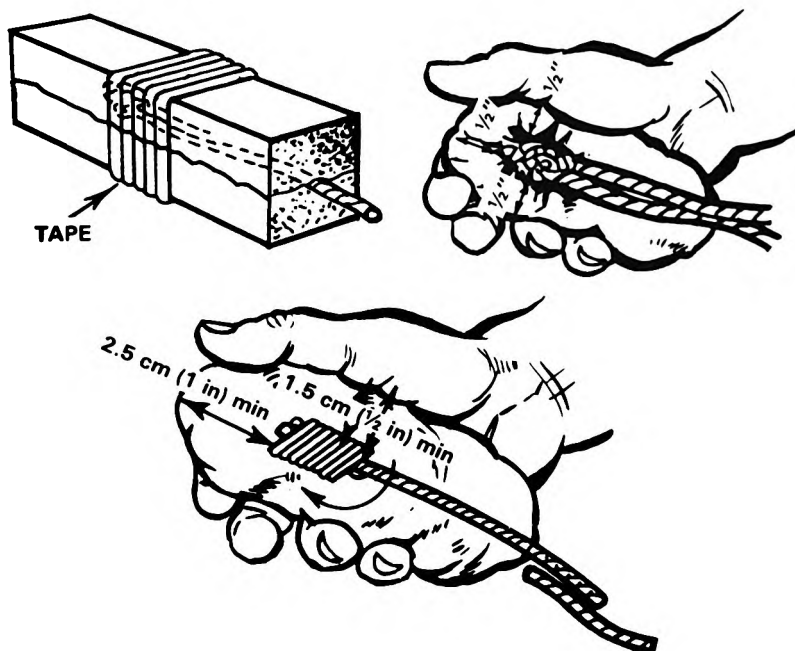
8 wraps minimum

(c) ULI KNOT



(b) TRIPLE ROLL KNOT

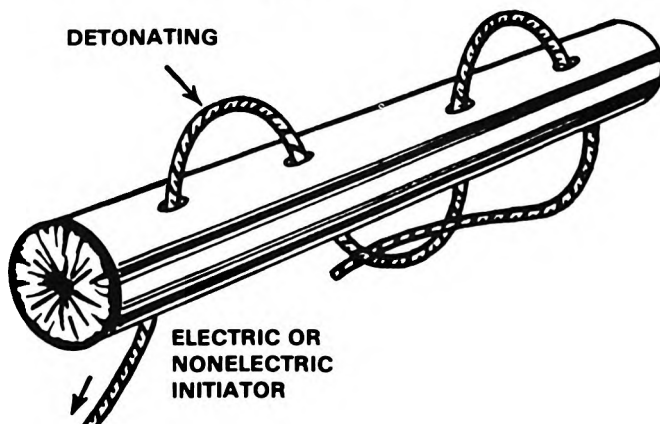
b. Then insert the knot into a block of explosive or a molded piece of explosive as shown. In either case, insure that there is at least  $\frac{1}{2}$  inch of explosive on all sides of the knot. (When using the Uli knot, a minimum of 1 inch of explosive must be on the end of the knot.)



### 3. Prime dynamite.

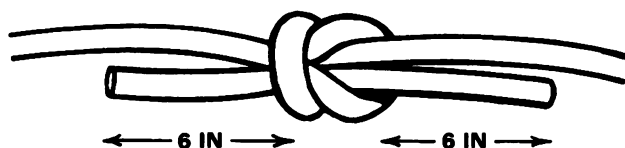
a. Dynamite cartridges may be primed with detonating cord by attaching a nonelectric blasting cap to the end of the detonating cord and following any of the methods for nonelectric priming.

b. Dynamite may also be primed by lacing the detonating cord through it. This is used chiefly in boreholes, ditching, or removal of stumps. Punch four equally spaced holes through the dynamite cartridge and lace the detonating cord through them as shown.

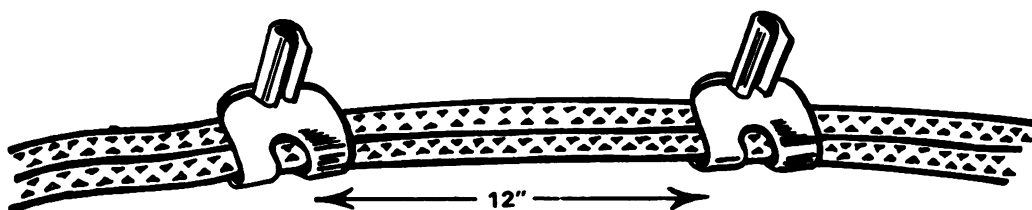


#### 4. Splicing the ends of detonating cord.

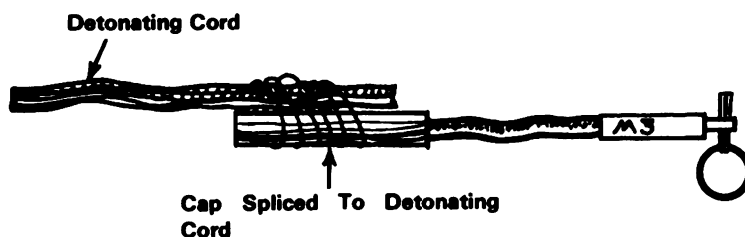
a. A square knot pulled tight is used to splice the ends of detonating cord. At least a 6-inch length should be left free at both sides of the knot. When fabric is used to cover the detonating cord, the fabric must not be removed.



b. Ends of detonating cord are spliced by overlapping them about 12 inches, using two clips, one at each end of the overlap, and bending the tongues of the clips firmly over both strands. The connection is made secure by bending the trough end of the clip back over the tongue.



5. To attach an electric or nonelectric (initiation) detonating assembly, splice the cap of either detonating assembly to the detonating cord using an M1 detonating cord clip, string, or adhesive tape.



#### REFERENCES:

FM 5-25, Explosives and Demolitions, Feb 71 (chap 2, pages 2-11 thru 2-12, para 2-10 and 2-12)  
 TEC Lesson 645-093-7322-F, Prepare Detonating Cord Firing System





**TASK NUMBER: 051-193-1502**

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**CLEAR DEMOLITION MISFIRES (ABOVE GROUND)**

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**CONDITIONS:**

Given a 1-pound electric or nonelectric primed charge; an electric or nonelectric 1- or 2-pound charge that has not been tamped, located above ground; blasting machine; galvanometer; and a demolition pit.

**NOTE: "Tamped" is defined as: material that has been packed around a charge to retain its explosive force.**

**STANDARDS:**

Misfires will be cleared in accordance with applicable performance measures below to prevent premature detonation of the misfired demolition charge.

**PERFORMANCE MEASURES:**

1. To clear a nonelectric misfire:
  - a. Wait 30 minutes before investigating the cause of the misfire.
  - b. Place a 1-pound charge as close to the misfire as possible without disturbing it.
  - c. For a nonelectrically primed charge, light the time fuse and move to a safe area.
2. To clear an electrical misfire:
  - a. Check the firing wire connection to the blasting machine or power-source terminals to be sure that the contacts are good.
  - b. Make two or three more attempts to fire the circuits.
  - c. Change the blasting machine or power source and attempt to fire again.
  - d. Disconnect the firing wires (shunt the wires to avoid possible static electric detonation) and investigate immediately.
  - e. Check the entire circuit, including the firing wire, for breaks and short circuits.

f. Place a new 1-pound electrically primed charge as close to the misfire as possible.

g. Move back to the firing position and fire the charge.

**REFERENCE:**

**FM 5-25, Explosives and Demolitions, Feb 71 (chap 2, sec I & II, page 2-3)**

**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION V  
ANTIARMOR**

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**TASK SUMMARIES**



## INTRODUCTION TO THE TOW

TOW stands for Tube-launched, Optically-tracked, Wire-command-link guided missile. The system is a crew portable, heavy antiarmor weapon designed to attack and defeat armored vehicles, and other targets such as field fortifications. It has a minimum range of 65 meters and a maximum range of 3,000 meters (3,750 meters with the extended-range missile). The launcher weighs 189 pounds assembled and consists of the following seven major components:

1. Launch tube.
2. Traversing unit.
3. Missile guidance set.
4. Daysight tracker.
5. Tripod.
6. Battery assembly (2).
7. AN/TAS-4 nightsight.

**NOTE: The launcher with an encased missile weighs 243 pounds.**

## TOW WEAPON SYSTEM DATA

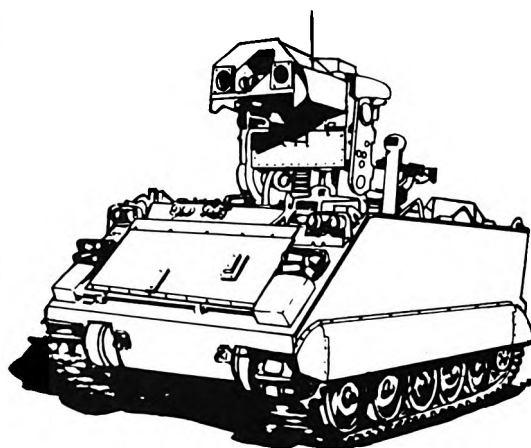
ITEM	LENGTH (in)	WIDTH (in)	HEIGHT (in)	WEIGHT (lb)
Launcher, tubular GM (deployed, max)	80	64	48	171
Launch tube	12	9	8	11
Traversing unit	13	22	21	53
Missile guidance set (including battery assembly)	16.0	16.0	12.0	54
Daysight tracker	22	13	14	32
Tripod (retracted, laying down)	43	13	13	21
Battery assembly	15.5	4.8	7.0	21
Encased missile	50.5	Diameter 8.6		55.4
AN/TAS-4 nightsight	19.5	8.8	8.0	18

The missile can be launched from the ground or from its primary mode on either the M113A1 armored personnel carrier (APC); M151A2 ¼-ton truck or M274A5 ½-ton weapons carrier; or M901 improved TOW vehicle (ITV). In addition, the TOW can be fired from the AH1S TOW Cobra attack helicopter.

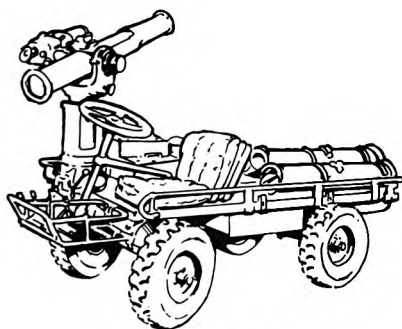
The TOW weapon system organic to the mechanized infantry battalion is mounted on the M113A1 APC or the M901 ITV. The TOW weapon systems in airborne infantry and infantry battalions are mounted on M151A2 ¼-ton trucks. The airmobile infantry battalions mount their TOW weapon systems on M274A5 ½-ton weapon carriers (Mule).



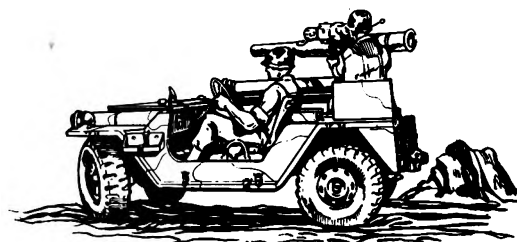
**AH1S TOW COBRA**  
*attack helicopter.*



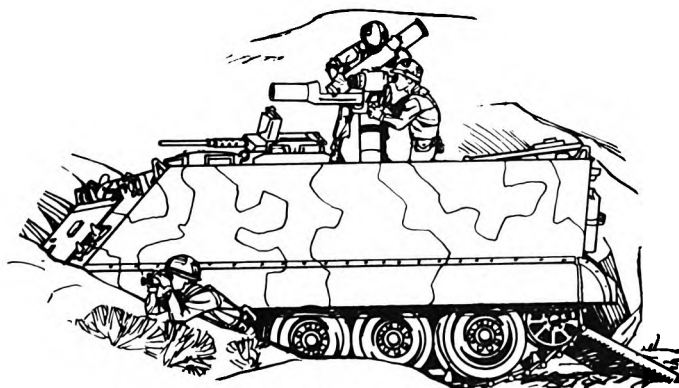
**M901 ITV.**



**M274A5**  
*1/2-ton weapon carrier.*



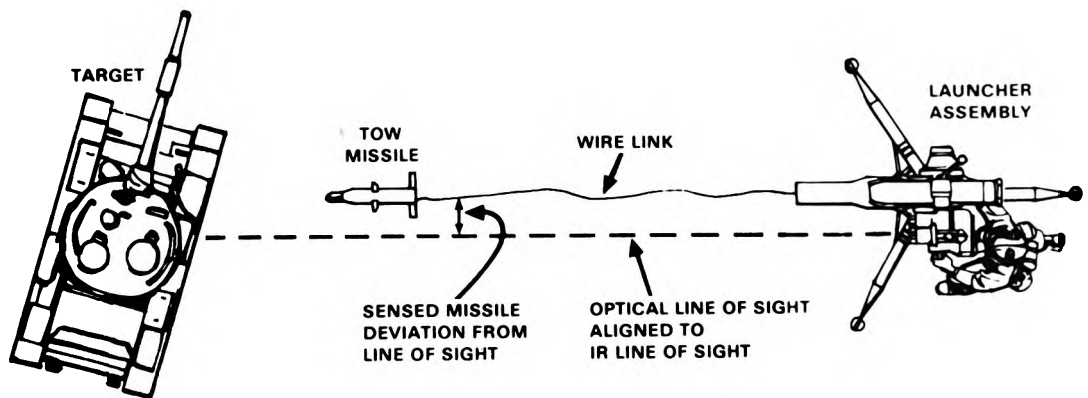
**M151A1**  
*1/4-ton truck.*



**APC M113A1**

The TOW will operate in all weather conditions in which the gunner can see the target through the 13-power daysight tracker or the 3-power AN/TAS-4 nightsight. The operating temperature range is from -25 degrees to +140 degrees F (-32 degrees to +60 degrees C); the launcher will operate at altitudes up to 3,050 meters (10,000 feet).

The TOW is very reliable and has a very high first-round hit probability. The system operates (figure 1) by the gunner keeping the crosshairs of his optical sight centered on the visible mass of the target. Any difference between the line-of-sight and the flight path of the missile is detected by the IR tracker and analyzed by the missile guidance set. Steering commands are then developed in the missile guidance set and sent through the command-link wires to the missile. The steering commands correct the flight path of the missile and guide it to the aim portion of the target. This is a continuous process until missile impact.



**WARNING:**

The backblast area for the TOW is 75 meters (50 meters danger area and 25 meters caution area).



**TASK NUMBER: 071-316-2500****ASSEMBLE THE TOW LAUNCHER****CONDITIONS:**

Given a disassembled TOW launcher and a direction of fire.

**STANDARDS:**

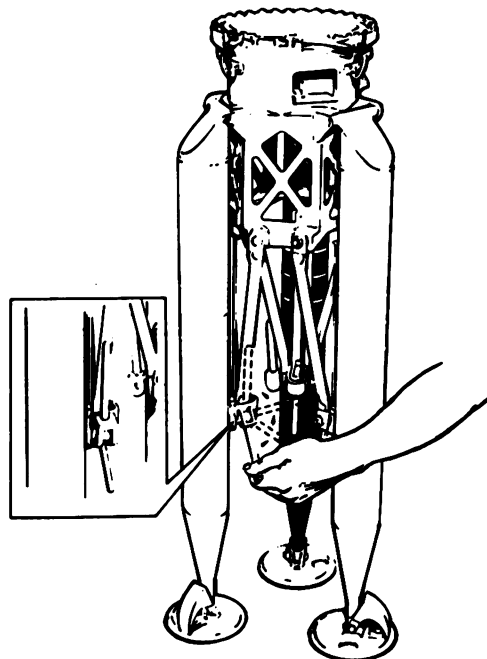
Within 2 minutes, assemble the launcher IAW the performance measures.

**PERFORMANCE MEASURES:**

1. **LAUNCHER SITE.** When assembling the launcher, the site for the tripod should not slope more than 30 degrees. Slopes of more than 30 degrees make levelling the tripod very difficult.

2. **SETTING UP THE TRIPOD.**

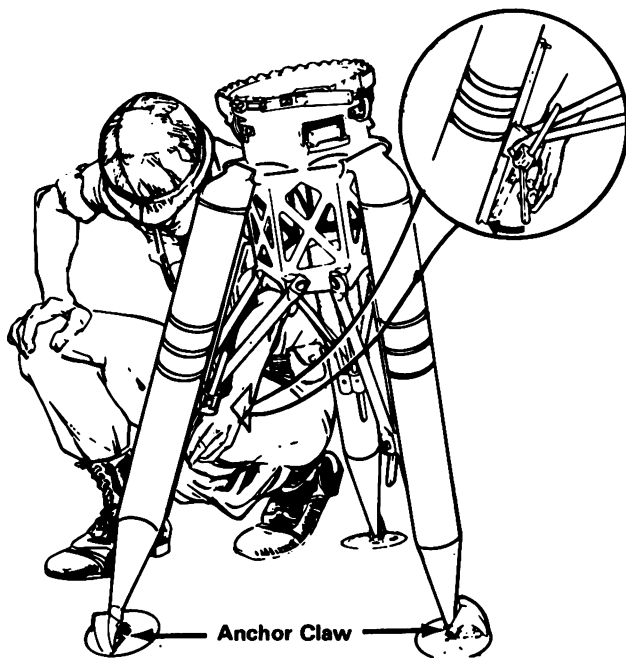
a. Place the tripod on the ground so that two legs are facing in the direction of fire (grooved coupling clamp locking handle to the front). Release the friction locks on each leg by pushing the friction locking handle up (figure 1).



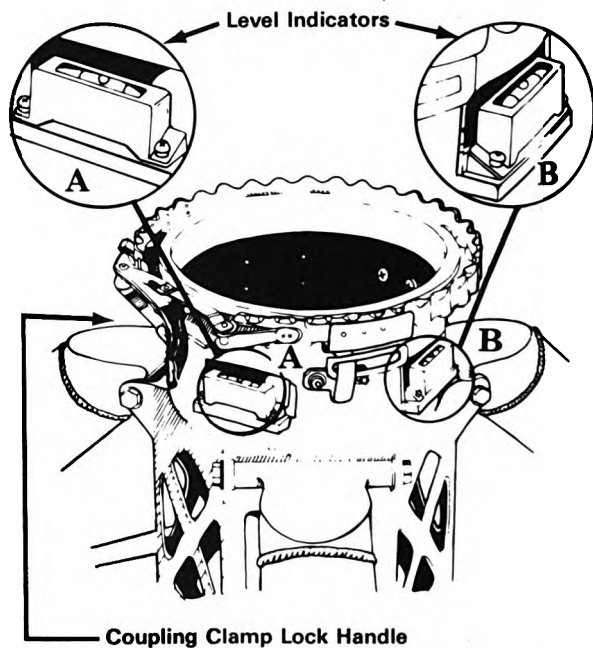
*Figure 1. Releasing friction locks.*

2-V-A-2.1

b. Starting with the rear leg, press the detent stop lever toward the leg until it disengages and release it as you pull the leg out (figure 2). As you pull the leg out, the detent stop should engage at the first detent stop position. Do each leg in the same manner.



*Figure 2. Disengaging the detent stop lever.*



*Figure 3. Level indicator with bubbles centered.*

c. Check your level indicators (figure 3). If the bubble is not between the indexing marks, you must adjust the legs. Do this by again pushing in on the detent stop lever to center one bubble and then the other. (Use the friction lock to lock the legs between detect positions if required while levelling.)

d. Lock all friction locks (return to down position) when the tripod is level.

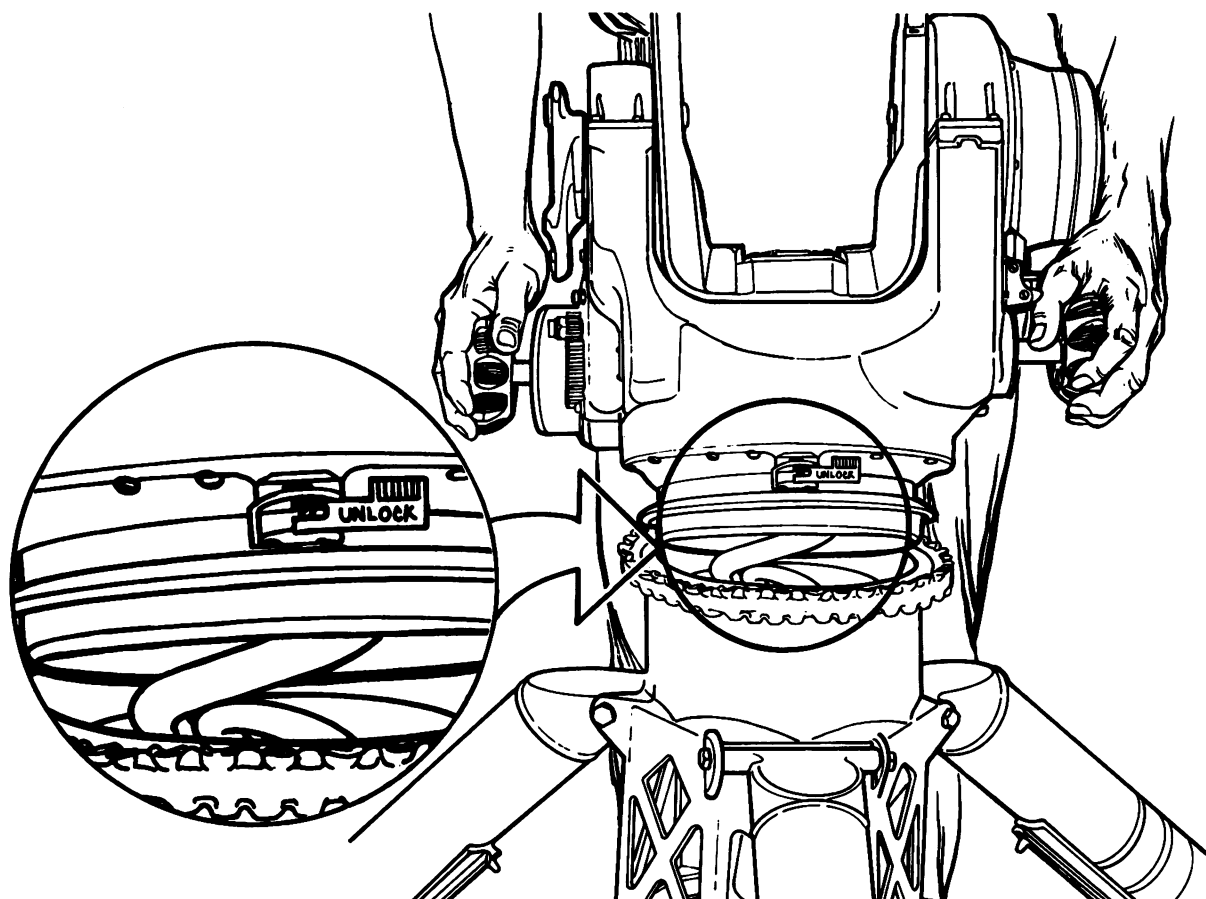
e. Step on each anchor claw to insure a firm base (see figure 2). Place a stake through the hole in the foot pad if additional stability is required. Recheck your level indicators.

### 3. INSTALLING THE TRAVERSING UNIT (figures 3 and 4).

**NOTE:** Coil should be placed back into traversing unit when it is dismounted from its organic carrier.

a. Open the coupling clamp lock handle on the tripod (figure 3).

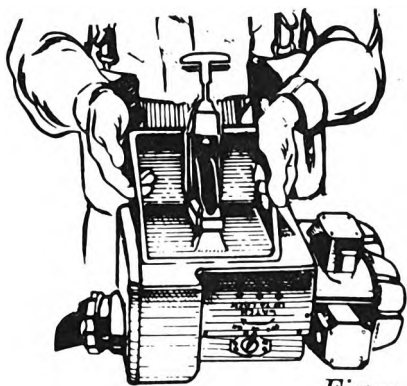
- b. Pull the coil cord from inside the traversing unit and extend it.
- c. Pick up the traversing unit and pass connector end of coil cord through body of tripod.
- d. Center traversing unit over tripod with the azimuth lock positioned opposite the direction of fire.
- e. Lock the coupling clamp and recheck the level indicators, re-level as necessary.



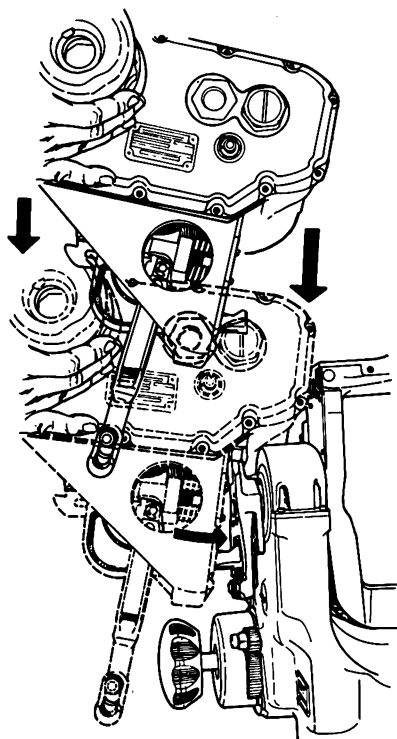
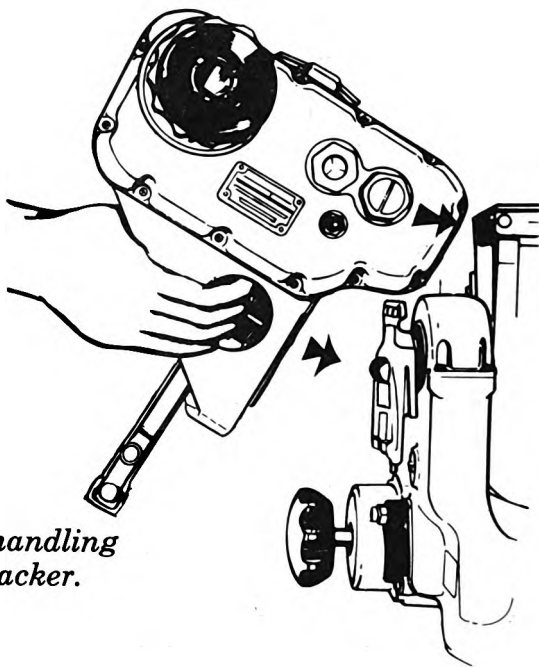
*Figure 4. Installing the traversing unit.*

#### 4. INSTALLING THE DAYSIGHT TRACKER.

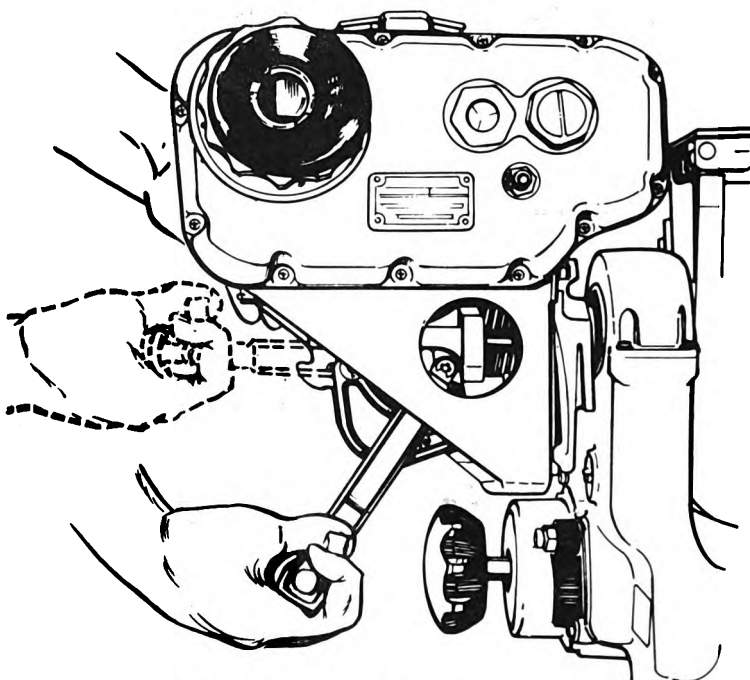
- a. Pick the tracker up using the holes in the mounting bracket (figure 5).
- b. With the locking latch assembly all the way down, align the top of the tracker mounting bracket over the top of the boresight plate on the traversing unit and lower the tracker into position against the boresight plate (figure 6).
- c. Lift up on the locking latch assembly to secure the tracker (figure 7). (Do not let go until you are sure it is secure.)



*Figure 5. Proper handling of the daysight tracker.*



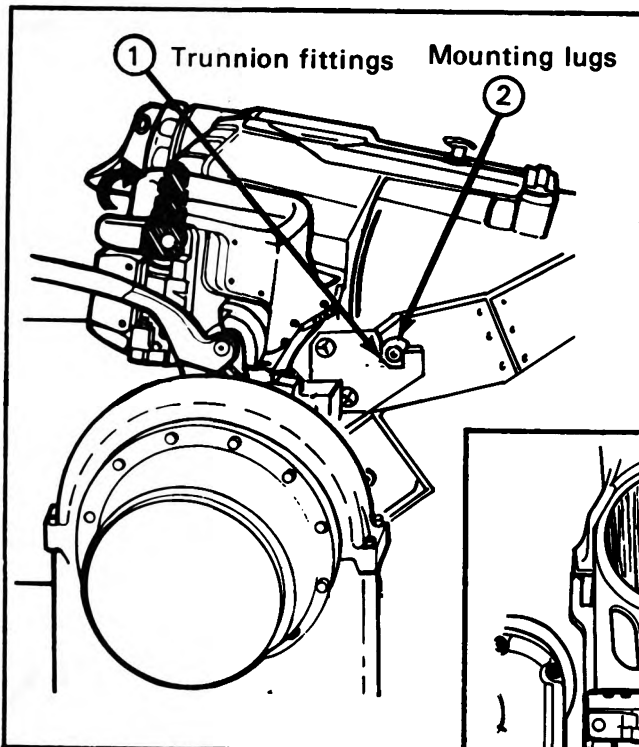
*Figure 6. Alinement of the daysight tracker on the boresight plate.*



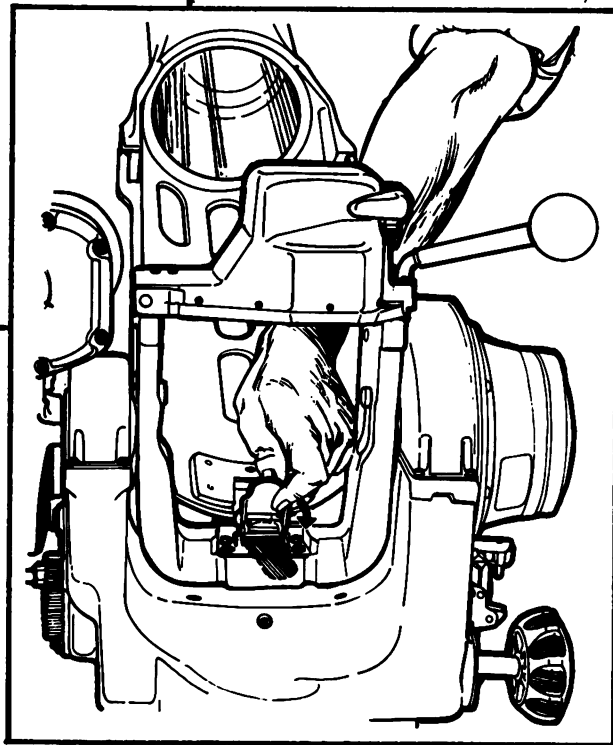
*Figure 7. Securing the daysight tracker onto the boresight plate.*

## 5. INSTALLING LAUNCH TUBE.

- a. Raise the forward end of the launch tube slightly and place the mounting lugs in the trunnion fittings (figure 8).
- b. Hold the launch tube latch up, and lower the forward end of the launch tube (figure 9).
- c. Secure the launch tube with the latch.



*Figure 8. Installing launch tube.*

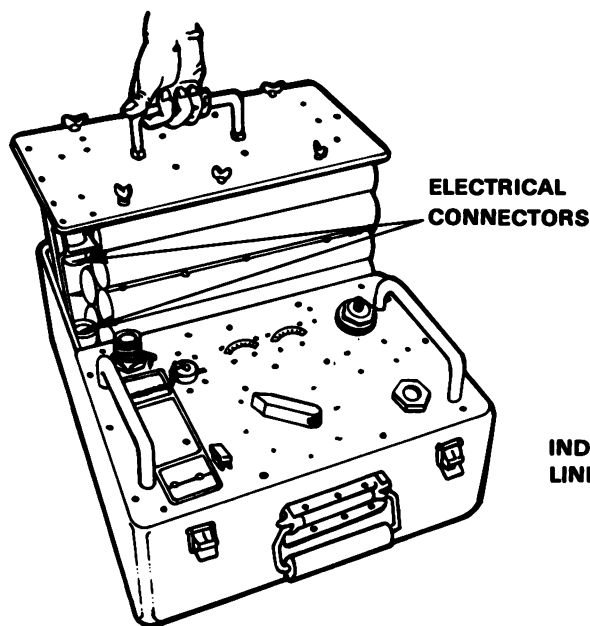


*Figure 9. Launch tube latch.*

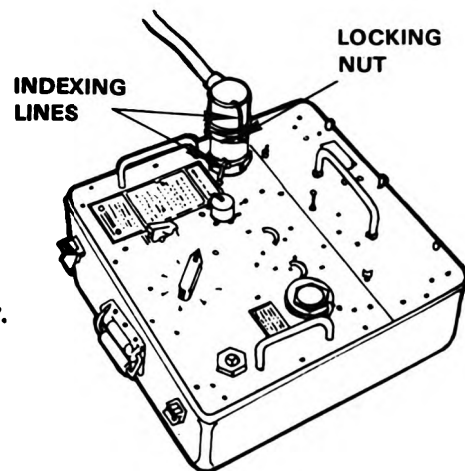
## 6. SETTING UP MISSILE GUIDANCE SET.

a. Remove the cover from the missile guidance set. Install a battery assembly in the battery well, insuring that the electrical connector are properly alined before seating the battery (figure 10). Tighten the six wingnut fasteners to secure it.

b. Pull the coil cord from under the traversing unit and aline the indexing lines on the connecting plug and the J1 connector (figure 11). Push down to seat the connecting plug on the J1 connector and tighten the locking nut.



*Figure 10. Installing battery assembly.*



*Figure 11. Alinement of indexing lines and locking nut.*

## REFERENCES:

TM 9-1425-470-12, Operator's and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapon System  
TEC Lesson 948-071-0020-F, Introduction to Antiarmor Weapons  
TEC Lesson 948-071-0021-F, Preparing the TOW for Ground Operation, Part I

**TASK NUMBER: 071-316-2501**

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**PERFORM OPERATOR MAINTENANCE  
ON A TOW LAUNCHER**

---

**CONDITIONS:**

Given a TOW launcher, a camel's-hair brush, lens tissue, orange wood stick, toluol solvent, ethyl alcohol, cleaning rags, mild detergent, warm water, and TM 9-1425-470-12.

**STANDARDS:**

1. All preventive maintenance checks and services will be conducted IAW table 3-1 of TM 9-1425-470-12.
2. All defective components/deficiencies are detected and reported.

**PERFORMANCE MEASURES:**

1. **Conducting a Visual Inspection.** During the visual inspection, the TOW launcher is completely assembled. Table 3-1 of TM 9-1425-470-12 gives step-by-step procedures for performing the visual inspection. After completion of the visual inspection, the self-test is performed to insure the serviceability of the launcher. You should report to your squad or section leader immediately any deficiency/shortcoming you cannot correct so the system can be repaired when time or the situation permits. In combat, it may be necessary to operate a system with some deficiencies. Normally, if all the components are present and the launcher passes the self-test, it will fire a missile.

2. **Cleaning Tips:**

- a. **Metal Parts.** Use dry, clean wiping rags to remove dust, dirt, grease, moisture, or other foreign matter from the launcher components. If the foreign matter cannot be removed using dry wiping rags, dampen a rag with alcohol or solvent and gently wipe the area.

**WARNING: Toluol solvent is toxic and flammable. Keep away from heat and open flames. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with the skin.**

**Ethyl alcohol is flammable. Keep all flammable cleaning materials away from open flames. Failure to do so could result in injury or death.**

b. **Rubber Parts.** Clean rubber parts using a mild detergent. Dry with a clean, absorbent wiping cloth. Do not get alcohol or solvent on rubber parts or seals.

c. **Glass Surfaces.** Remove loose particles of dust and lint with a camel's-hair brush. Then wipe in a circular motion using lens tissue dry or moistened with ethyl alcohol. Use a small stick or swab wrapped with lens tissue to remove matter which remains. Starting at the center of the lens, swab in an expanding circular motion until the entire surface is clean.

(1) Do not clean glass surfaces of the daysight tracker with rags or other materials that might scratch and thereby degrade system performance.

(2) Use only authorized lens tissue to clean optical surfaces. Do not use the silicone-treated paper that is used for eyeglasses.

(3) Avoid touching optical surfaces with fingers.

d. **Launch Tube.** Use a dry cloth to remove loose dirt, dust, or debris from bore of launch tube; flush off caked mud with clean water.

e. **Battery Compartment.** Remove battery assembly from missile guidance set; clean and dry battery compartment.

f. **Battery Assembly.** Clean battery assembly with a clean, damp cloth or plastic brush. Wipe dry with a clean wiping rag. White, powdery deposits on the cells are caused during charging operations. They are harmless but should be removed to prevent buildup.

g. **Cloth and Plastic.** Flush caked mud, dirt, dust, and other debris from the shroud and strap assemblies using clean water. Scrub the outside of the shroud assembly and the strap assembly, using a mild detergent, warm water, and a scrub brush or rag. Use a clean, damp rag to clean the lining of the shroud assembly. Dry the lining and all metal parts of both assemblies using a clean, absorbent cloth.

h. **Cleaning Procedures for Cold Weather.**

(1) If the temperature is below 32 degrees F (0 degrees C), add glycerin to the cleaning water. This will stop the water from freezing.

(2) Apply deicer to glass surfaces to remove ice. Pat the surface with a clean, absorbent wiping rag. DO NOT RUB. Clean with lens tissue when the surface is dry.

(3) Avoid breathing on the optical sight.

i. **Spot Painting.** Use quick-drying semi-gloss enamel No. 24087 for all olive drab and No. 27038 for all black front panels. The surfaces must be clean and free from rust, corrosion, dirt, flaking, and other foreign materials before painting.

j. **Replace the Missile Guidance Set (MGS) Desiccant.**

(1) Check the humidity indicator on the MGS. If the 40% sector of the humidity indicator is white or pink, replace the desiccant.



(2) To replace the desiccant, remove the cover from the desiccant container (upper right corner of MGS). Remove the old desiccant bag and discard. Insert a new desiccant bag and replace the container cover.

**REFERENCES:**

**TM 9-1425-470-12, Operator's and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapon System, Jan 74, C5 (chap 3)**

**TEC Lesson 948-071-0027-F, Maintenance of the TOW System**



**TASK NUMBER: 071-316-2502**

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**CONDUCT A SYSTEM SELF-TEST  
AND PREOPERATION INSPECTION OF A  
TOW LAUNCHER AND ENCASED MISSILE**

---

**CONDITIONS:**

Given an assembled ground- or vehicle-mounted TOW launcher and an encased missile, and TM 9-1425-470-12.

**STANDARDS:**

1. Conduct a system self-test of the TOW launcher when any of the following conditions exist:
  - a. Before and after installation of the TOW on its organic carrier.
  - b. Daily, once the system is installed on the carrier.
  - c. Anytime you change locations using the extended travel configuration.
2. Conduct a preoperation inspection of the encased missile/missile simulation round prior to firing IAW performance measures.
3. All defective components are reported.

**PERFORMANCE MEASURES:**

1. The system self-test.

**NOTE:** The self-test uses battery power, so perform it rapidly.

- a. To conduct the system self-test, hold the TEST OPERATE switch in the TEST position and rotate the SELF-TEST switch to each of the seven test positions when performing the actions in table 1.
- b. The elevation and azimuth meters on the missile guidance set, which indicate the operational condition of the various components of the launcher, will register either in-band or out-of-band (figure 1). An in-band reading indicates a component is functioning properly, and an out-of-band reading indicates a component is not functioning properly and corrective action is required.
- c. Perform the actions specified in table 1 for each of the seven positions. The table lists the sequence, normal meter reading, and appropriate corrective action if a normal reading is not obtained.
- d. If corrective action is performed, other than boresighting, the whole self-test must be repeated.

**TABLE 1**  
**PROCEDURES FOR SYSTEM SELF-TEST**

STEP	PROCEDURE	NORMAL INDICATIONS		CORRECTIVE ACTIONS FOR OTHER THAN NORMAL READINGS
		AZIMUTH METER	ELEVATION METER	
1	Set SELF-TEST switch to position 1.	In-band	In-band	1. Replace battery assembly and tag for recharging. 2. Replace missile guidance set if trouble remains.
2	Set SELF-TEST switch to position 2.	In-band	In-band	Replace missile guidance set.
	a. Release elevation lock and move launch tube  UP ----- DOWN -----  LOCK ELEVATION LOCK		Moves Right Moves Left	1. Replace traversing unit. 2. Replace missile guidance set if trouble remains.
	b. Release azimuth lock and move launch tube.  RIGHT ----- LEFT ----- LOCK AZIMUTH LOCK	Moves Right Moves Left		1. Replace traversing unit. 2. Replace missile guidance set if trouble remains.
3	Set SELF-TEST switch to position 3.	In-band	In-band	Replace missile guidance set.
4	Set SELF-TEST switch to position 4.	In-band	In-band	Replace missile guidance set.
5	Set SELF-TEST switch to position 5. (TEST OPERATE switch must be in TEST position when SELF-TEST switch is rotated.)	In-band after 8 to 12 seconds.	Rotate in and out of band and then remain in-band after 8 to 12 seconds.	Replace missile guidance set.
6	Set SELF-TEST switch to position 6.	In-band	In-band	Replace missile guidance set.
7	Set SELF-TEST switch to position 7. (Shade lens in sunlight to prevent needles from oscillating.)  *Exact alinement with index mark is not necessary, but it should be alined as close as possible without using excessive battery power.	a. Tracker motor in optical sight is running. b. *Center Index Mark.	*Center Index Mark.	a. Replace daysight tracker. b. Adjust focusing to +3 or more. c. Boresight by adjusting the azimuth and elevation knobs on the optical sight one at a time to obtain correct readings.  <b>WARNING</b>  IF THERE IS NO NEEDLE MOVEMENT ON THE AZIMUTH OR ELEVATION METER WHEN YOU ADJUST THE AZIMUTH OR ELEVATION KNOBS, RELEASE THE TEST OPERATE SWITCH.  Get a good sight and do the test again. If there is still no movement, REPLACE THE MISSILE GUIDANCE SET (it was probably damaged by the first sight).  Do not hook up the first optical sight with another missile guidance set. Turn it in to your maintenance support unit for checkout.  d. If a normal reading cannot be easily obtained because the needles are fluctuating, release TEST OPERATE switch and preset boresight knobs to their center position.

*Table 1. Procedures For System Self-Test*

STEP	PROCEDURE	NORMAL INDICATIONS		CORRECTIVE ACTIONS FOR OTHER THAN NORMAL READINGS
		AZIMUTH METER	ELEVATION METER	
8	After checking position 7, set SELF-TEST switch to position 1 to insure there is enough power to fire the next missile.	In-band	In-band	Same as step 1.
9	Release TEST OPERATE switch and rotate SELF-TEST switch to unmarked position.			

Table 1. Continued.

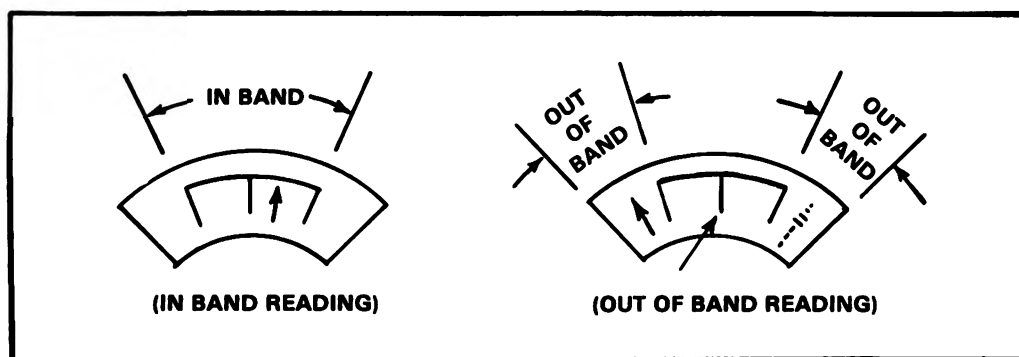


Figure 1. ELEVATION AND AZIMUTH METER

**WARNING: DO NOT CONDUCT A SYSTEM SELF-TEST UNLESS THE LAUNCHER IS ASSEMBLED. THE TRAVERSING UNIT MUST BE CONNECTED TO THE MISSILE GUIDANCE SET BY THE COIL CORD, AND THE DAY SIGHT TRACKER MUST BE PROPERLY MOUNTED.**

e. When checking position 7, boresight alinement of the daysight tracker and infrared tracker, aline the meter needles as closely as possible with the CENTER INDEX MARK.

(1) If they are not alined, adjust the boresight knobs on the optical sight, one at a time, to aline them. The elevation knob is located below the lens, and the azimuth knob is located to the right of the lens.

(2) In addition to checking position 7 (boresight) during the self-test, check it:

- After difficult cross-country movement.
- After a change in temperature of 10 degrees.
- Every 4 hours.

## 2. Preoperation Inspection (table 2).

a. The preoperation inspection outlined in table 2 should be made periodically during operations as well as when the system is assembled.

b. The checks do not necessarily have to be performed in the order listed.



STEP	ITEM	PROCEDURE	NORMAL FUNCTION
1	Meter Lights	<ol style="list-style-type: none"> <li>1. Push TEST OPERATE switch to test.</li> <li>2. Release switch.</li> </ol>	1. Lights illuminate. (Shade meters on sunny days.)
2	Reticle Light	<ol style="list-style-type: none"> <li>1. Set reticle light switch to ON and focus crosshairs.</li> <li>2. Return switch to OFF.</li> </ol>	1. Crosshairs illuminate. (Cover lens during daylight.)
3	Trigger	<ol style="list-style-type: none"> <li>1. Lift trigger protective cover. Depress and release trigger.</li> <li>2. Close trigger protective cover.</li> </ol>	1. Trigger springs back.
4	Bridge Clamp	<ol style="list-style-type: none"> <li>1. Raise bridge clamp.</li> <li>2. Check electrical connector. (Arming lever should not be raised.)</li> <li>3. Close bridge clamp and lock.</li> <li>4. Raise and lower arming lever.</li> <li>5. Raise locking handle slowly to check wire cutter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Bridge clamp operates with no binding.</li> <li>2. Clean and free of dirt or grease.</li> <li>3. Bridge clamp is tightly secured.</li> <li>4. Electrical connector protrudes and retracts.</li> <li>5. A click can be heard.</li> </ol>
5	Launch Tube	<ol style="list-style-type: none"> <li>1. Check breech and bore.</li> <li>2. Alinement and security.</li> </ol>	<ol style="list-style-type: none"> <li>1. Free of foreign matter.</li> <li>2. Lugs properly seated and launch tube latch locked.</li> </ol>

Table 2.

**REFERENCES:**

**TM 9-1425-470-12, Operation and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapon System, Jan 74, C5 (chap 2, page 2-18)**





**TASK NUMBER: 071-316-2515**

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**INSTALL THE TOW LAUNCHER AND ENCASED MISSILE  
ON ITS ORGANIC CARRIER (FOR EXTENDED TRAVEL)**

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**CONDITIONS:**

Given a complete TOW launcher, an encased missile, and an organic TOW carrier.

**NOTE: THIS TASK DOES NOT APPLY TO ITV CREWMEN.**

**STANDARDS:**

Within 5 minutes, install and secure the launcher and missile in the extended travel configuration.

**PERFORMANCE MEASURES:****1. Stowing the Launcher and Encased Missile on the M113.****a. To stow the launch tube (figure 1).**

(1) Place the breech (rear) end of the launch tube in the forward support assembly above the missile racks so the support pin in the assembly fits in the locating hole in the launch tube.

(2) Push the muzzle end of the launch tube into position so it is against the stop on the rear assembly and secure the retaining strap.

**b. To stow the tripod (figure 1).**

(1) Position the closed tripod on the triangular plate just forward of the missile racks, and place the tiedown cap in the flange of the tripod.

(2) Secure the tiedown cap with the long strap attached to the triangular plate.

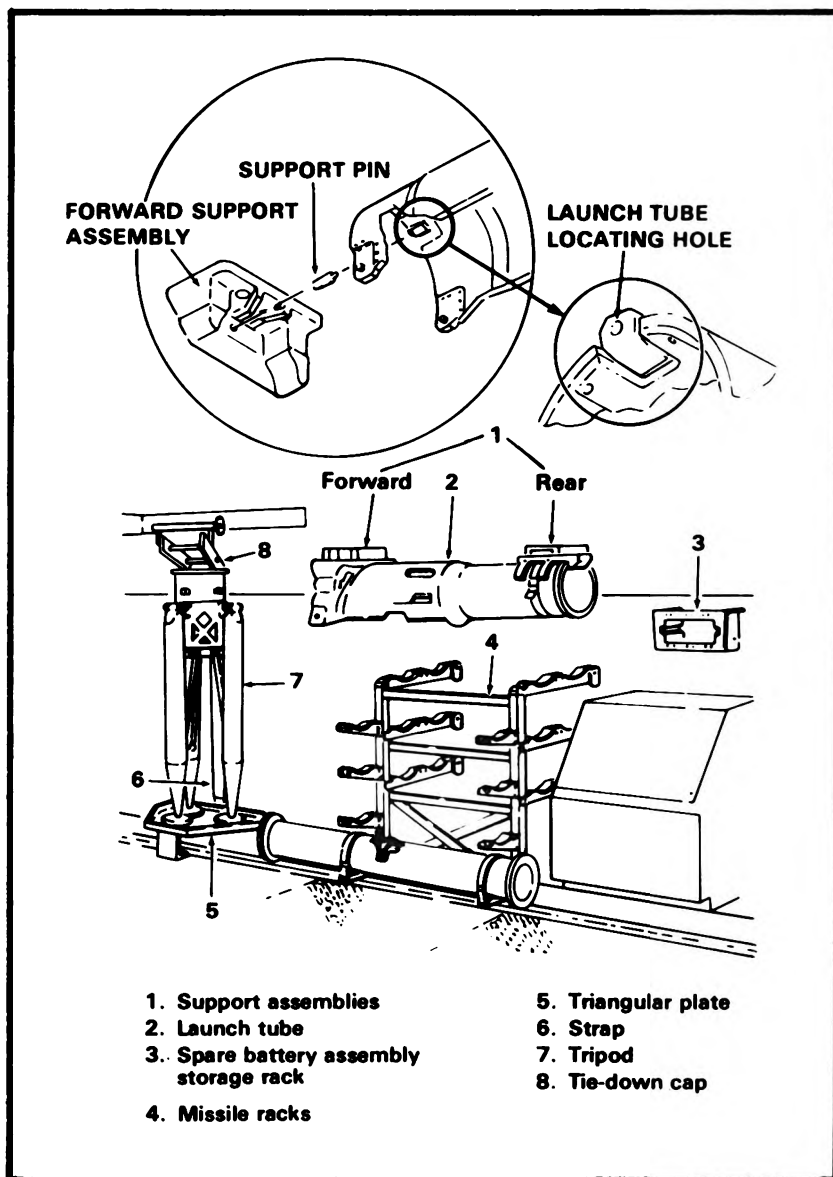
**c. To stow the traversing unit (figure 2).**

(1) Open the coupling clamp lock handle on the pedetal mount.

(2) Pick up the traversing unit.

(a) Pull the coil cord from inside the unit and extend it.

(b) Pass the coil cord through opening in the body of the pedestal mount.



(3) Place traversing unit on pedestal mount and close the coupling clamp locking handle.

(4) Aline the indexing marks of the connector on the coil cord with the index mark on the pedestal mount receptacle.

(5) Connect the coil cord to the receptacle inside the pedestal mount.

(6) Lock the elevation lock.

**d. Stowing the daysight tracker (figure 2).**

(1) Release the azimuth lock, if locked, on the traversing unit and rotate it about 45 degrees to the left.

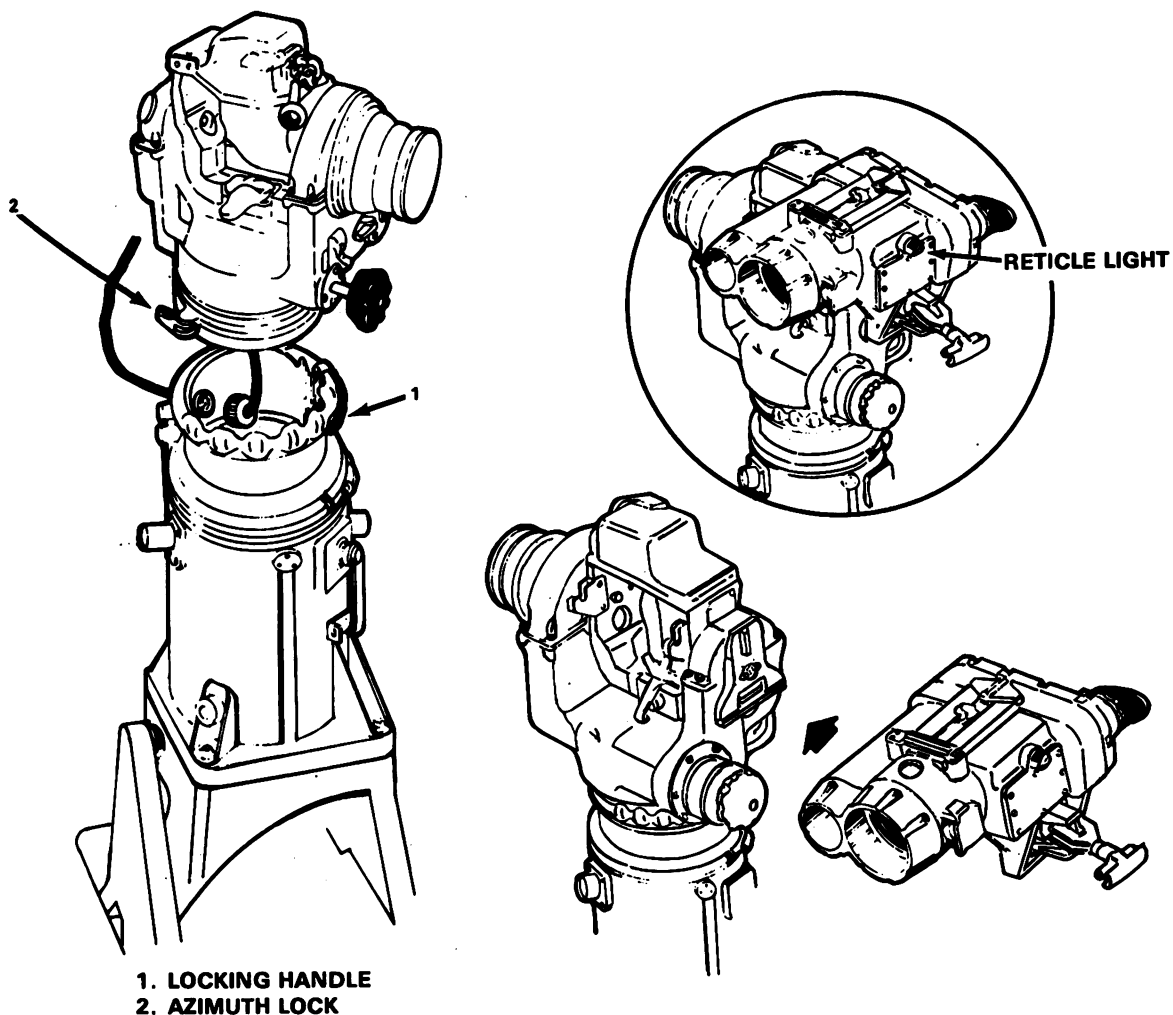
(2) Pick up the tracker using the holes in the mounting bracket.

(3) With the locking latch assembly all the way down, align the top of the tracker mounting bracket over the top of the boresight plate on the traversing unit and lower the tracker into position against the boresight plate.

(4) Lift up on the locking latch assembly to secure the tracker. (Do not let go until you are sure it is secure).

(5) Rotate the traversing unit back to the front and lock the azimuth lock.

(6) Insure that the reticle light switch is OFF.



*Figure 2.*

2-V-A-5.3

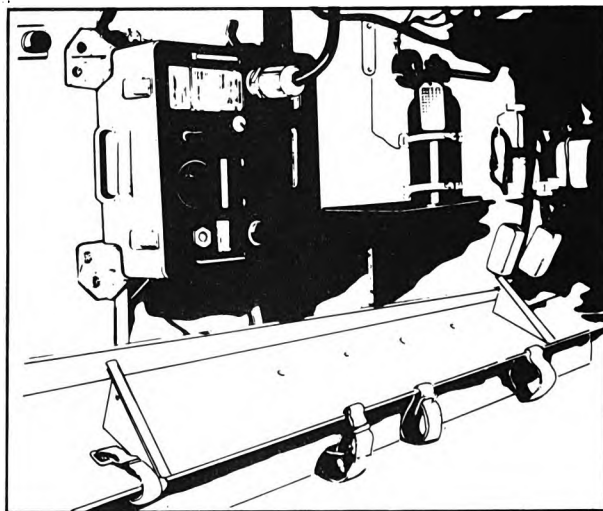
e. Missile guidance set (figure 3).

(1) Remove the cover.

(2) Place the missile guidance set (battery to the right) in the bracket located on left wall of the vehicle. Secure with the four straps.

**NOTE: Some carriers have the mounting brackets mounted so that the battery is to the front of the vehicle.**

(3) Connect the pedestal cable to the J1 connector on the missile guidance set.



*Figure 3.*

f. Spare battery assembly. Stow the spare battery assembly in the storage rack located to rear of the missile rack. Secure with the winged battery fasteners (figure 1).

**WARNING:**

**Under normal conditions the battery assembly is nonhazardous; however, if a battery should be damaged, care should be taken to prevent any part of the body (especially the eyes) from coming in contact with the electrolyte since it is highly corrosive.**

g. Missiles.

(1) Stow the missile with the nose end to the front of the vehicle and with electrical connectors up (figure 1).

(2) Load the bottom rack first and work up.

(3) Secure each missile with the tiedown straps.

**2. Stowing the Launcher and Encased Missile on the M151.****a. To stow equipment on the firing vehicle.****(1) To stow the traversing unit.**

(a) Open the coupling clamp lock handle.

(b) Pick up the traversing unit.

1. Pull the cord from inside the traversing unit and extend it.

2. Pass connector end of coil cord through body of launcher mount.

(c) Mate traversing unit onto the launcher mount and secure in place with coupling clamp locking handle.

(d) Lock the elevation lock and azimuth lock.

**(2) To stow the missile guidance set (MGS).**

(a) Install the MGS in the elevated rack assembly with the battery assembly to the front.

(b) Secure the MGS with the tie down straps.

(c) Pull the coil cord through the opening in the launcher mount.

(d) Aline the indexing lines on the coil cord connector and the J1 connector.

(e) Push down to seat the coil cord connector on the J1 connector and tighten the locking nut.

**(3) To stow the daysight tracker.**

(a) Pick up the tracker using the holes in the mounting bracket.

(b) With the locking latch assembly all the way down, aline the top of the tracker mounting bracket over the top of the boresight plate on the traversing unit and lower the tracker into position against the boresight plate.

(c) Lift up on the locking latch assembly to secure the tracker.

**(4) To stow the launch tube.**

(a) Raise the forward end of the launch tube slightly and place the mounting lugs on the trunnion fittings.

(b) Hold the launch tube latch up, and lower the forward end of the launch tube.

(c) Secure the launch tube with the latch and tap or lift upward to insure it is secured.

**(5) Stowing the tripod.**

- (a) Unlock the two securing latches and raise the missile rack.**
- (b) Place the tripod with the foot pads facing to the rear and two legs down.**
- (c) Secure the tripod with the two tiedown strap assemblies over the top leg.**
- (d) Lower the missile rack and secure both latches.**

**(6) Stowing missiles on firing vehicle.**

- (a) Place missiles in the rack with the nose end toward front of vehicle and electrical connectors facing up.**
- (b) Secure the missiles with the two tiedown straps.**

**b. Stowing equipment on the 1/4-ton missile carrier.**

**(1) Stowing spare battery assembly.**

- (a) Stow the spare battery assembly in the storage rack between the driver and passenger seats.**
- (b) Secure with the winged battery fasteners.**

**WARNING**

**Under normal conditions the battery assembly is nonhazardous; however, if a battery should be damaged, care should be taken to prevent any part of the body (especially the eyes) from coming in contact with the electrolyte since it is highly corrosive.**

**(2) Stowing missiles.**

- (a) Before loading, check and determine if both seats are adjustable. If so, slide both to a forward position. If not, remove rear hold down pin and raise seats.**
- (b) Remove ball lock pin from right No. 2 saddle. Swing saddle to an upward position.**
- (c) Install encased missile in lower forward position with forward end to right side of vehicle with the electrical connector up.**
- (d) Secure the encased missile with tiedown straps on left and right sides of vehicle.**
- (e) Return right No. 2 saddle to normal position and secure with ball lock pin.**
- (f) Load remaining encased missiles as above (steps (c) and (d)) from front to rear.**

**REFERENCES:**

**TM 9-1425-470-12, Operation and Organizational Maintenance  
Manual for TOW Heavy Antitank Weapon System, Jan 74, C5 (page  
3-5 thru 3-15)**

**TEC Lesson 948-071-0025-F, The TOW/APC System**

**TEC Lesson 948-071-0026-F, The TOW ¼-Ton System**





**TASK NUMBER: 071-316-2516**

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**DETERMINE TOW FIRING LIMITATIONS**

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**CONDITIONS:**

Given a ground- or vehicle-mounted TOW weapon system, a firing position, and a sector of fire.

**STANDARDS:**

Explain each of the TOW firing limitations listed below:

1. Over water.
2. From a carrier.
3. Over electrical wires.
4. In windy conditions.
5. Through smoke and fire.
6. From bunkers and buildings.
7. Clearance requirements.

**PERFORMANCE MEASURES:****1. FIRING OVER WATER.**

a. Firing across bodies of water wider than 1,000 meters can reduce the range of the TOW. Signals being sent through the command-link wires are shorted out when a large amount of wire is submerged in water. If the range is less than 1,000 meters, there is no effect on the missile's range. A TOW position should be as high above, and as far back from, the water as the tactical situation will allow. Analyze your sector as soon as you occupy your position to determine limiting effects of water.

(1) To determine how much water you are capable of firing across, you must first determine how high above water your firing position is (in meters). Then determine how high above water your target will be (in meters). A meter is approximately 3.3 feet.

(2) Then go to the chart that corresponds to the missile you are using: regular-range chart (figure 1) for 3,000-meter missiles, and extended-range chart (figure 2) for 3,750-meter missiles.

(3) Find the number on the left side of the chart that corresponds to the height of your launcher above water. Place one end of a straightedge on the tick mark beside that number.

(4) Find the number on the right side of the chart that corresponds to the height of the target above water. Place the other end of the straightedge on the tick mark beside that number.

(5) Read the number at the exact location where the straightedge crosses the center line. You may have to estimate if the straightedge crosses between two numbers. This number is the number of meters of water you can fire over.

b. If you know the water you are firing over is wider than 1,000 meters, you can determine how far your missile will travel.

(1) First, you must determine how far your launcher is from the water (in meters). (See example, step A.)

(2) Then add 1,600 meters. The missile can travel at least the distance from your launcher to the water plus 1,600 meters. (See example, step B.)

(3) Next, determine how high your launcher is above water (in meters). (See example, step C.)

(4) Then determine how high your target will be above water (in meters). (See example, step D.)

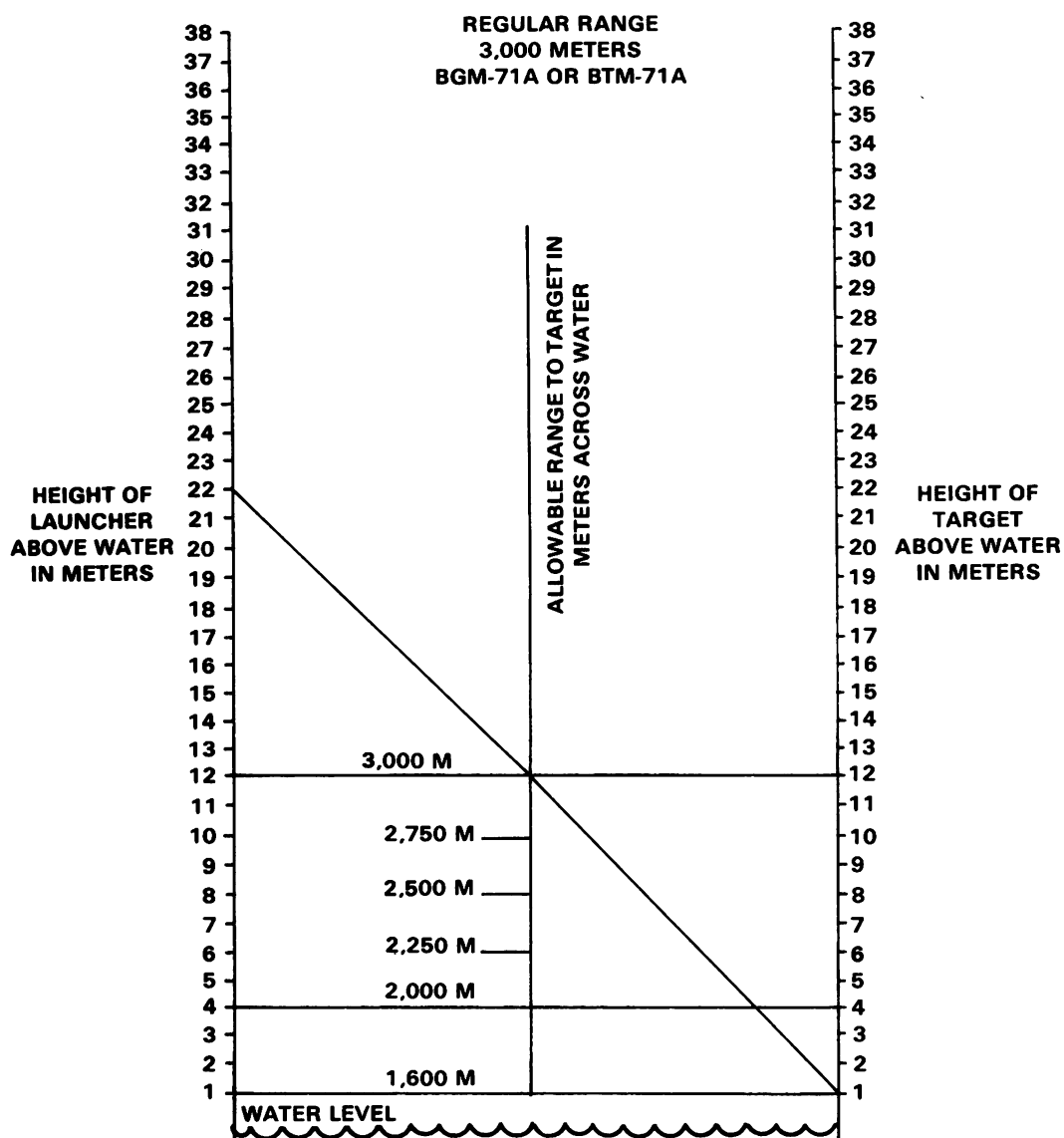
(5) Add these two together and multiply by 60. (For every meter that your launcher or target is above water, you can add 60 meters to the distance that the missile can travel.)

(6) Add total in step E to total in step B.

(7) After you have completed steps A through F, you will know the maximum engagement range.

#### **EXAMPLE:**

You have determined your launcher is 500 meters from a lake that is wider than 1,000 meters. Your launcher is 5 meters above water and your target is 6 meters above water.



*Figure 1. Regular-range chart.*

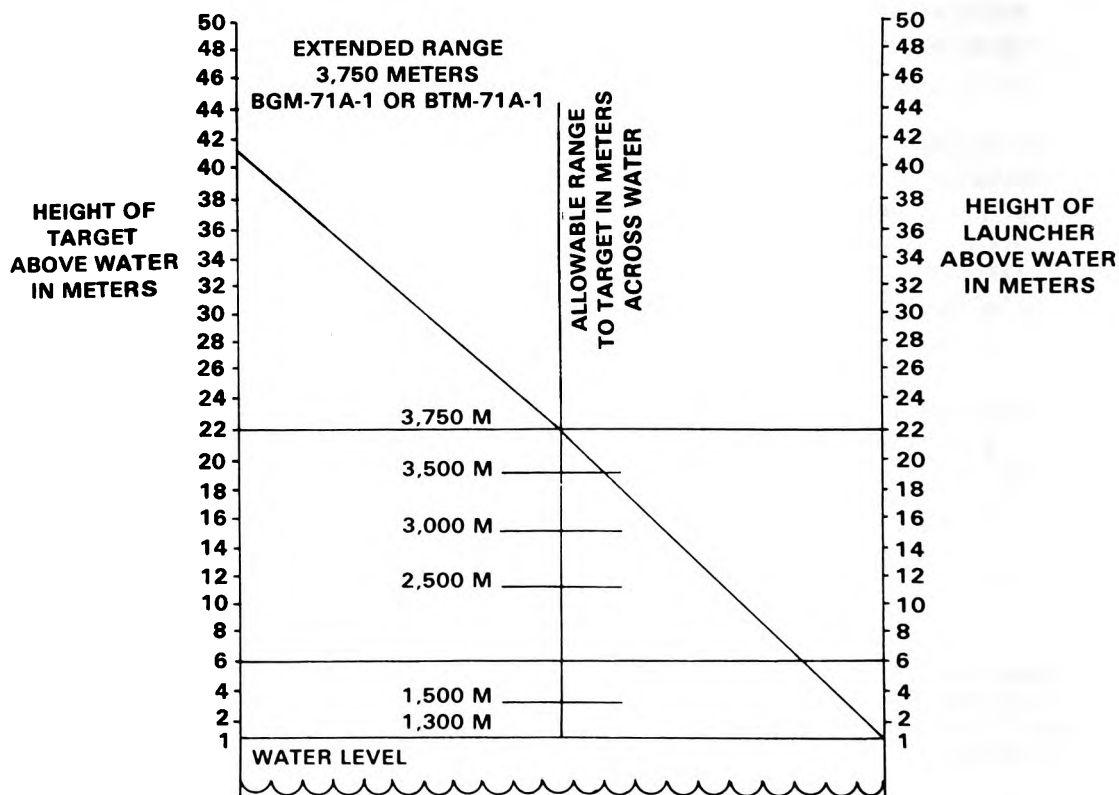


Figure 2. Extended-range chart.

STEP A.	DISTANCE FROM LAUNCHER TO LAKE	500 meters
STEP B.	DISTANCE YOU KNOW THE MISSILE CAN TRAVEL DISTANCE MISSILE CAN TRAVEL AT WATER LEVEL	+ 1,600 meters <u>2,100 meters</u>
STEP C.	HEIGHT OF LAUNCHER ABOVE WATER	5 meters
STEP D.	HEIGHT OF TARGET ABOVE WATER	+ 6 meters 11 meters
STEP E.	60-METER INCREASE IN DISTANCE FOR EVERY 1 METER HEIGHT ABOVE WATER.	x 60 <u>660 meters</u>
STEP F.	DISTANCE AT WATER LEVEL MISSILE CAN TRAVEL	2,100 meters
	INCREASED DISTANCE DUE TO HEIGHT OF LAUNCHER AND TARGET ABOVE WATER	+ 660 meters <u></u>
	MAXIMUM ENGAGEMENT RANGE	2,760 meters

**NOTE:** To increase your maximum engagement range, raise the launcher's height 1 meter for each 60-meter increase in range required.

**2. FIRING FROM TOW CARRIERS.** Insure that the backblast area is clear and that the backblast is not directed into the vehicle. Also insure that there is adequate muzzle clearance between the launcher and the vehicle.

**3. FIRING OVER ELECTRICAL WIRES.** If the command-link wires contact a live high-voltage powerline, you can be injured or lose control of the missile. The launcher electronics may also be damaged.

**4. FIRING IN WINDY CONDITIONS.** Gusty, flanking, or quartering winds can cause the launch tube to vibrate and spoil your tracking performance. The effect is similar to what you experience while driving in a strong crosswind. Position the TOW behind a windbreak to reduce this problem. Strong winds can move the missile around during flight, but as long as you can keep the crosshairs on center-mass of the target, the weapon system itself will compensate for wind effects.

**5. FIRING THROUGH SMOKE AND AREA FIRES.** Smoke can obscure your line of sight and hide the target. You should maintain a smooth tracking rate as the target disappears into the smoke cloud so that you will still be on target or very close as the vehicle goes out the other side of the smoke cloud. (This technique should be practiced during field tracking exercises.) A fire can burn through the command-link wire, causing you to lose control of the missile. Avoid firing through fire and over fires if there is the possibility that the wires will contact the fire before missile impact.

**6. FIRING FROM BUNKERS AND BUILDINGS.** TOWs can be fired from enclosures if the following requirements are met:

a. **Size of the room.** The size of the room should be 17 x 24 feet with a 7-foot ceiling. Smaller rooms may be used if there is adequate ventilation for backblast.

b. **Ventilation.** There must be at least 20 square feet of ventilation, preferably to the rear of the launcher. Open all windows and doors.

c. **Debris.** Clear the room of all loose objects that will be affected by backblast. This includes breaking out all glass windows and clearing all rubble from the backblast area. The room should be of sturdy construction. Everyone in the room must be forward of the rear end of the launch container.

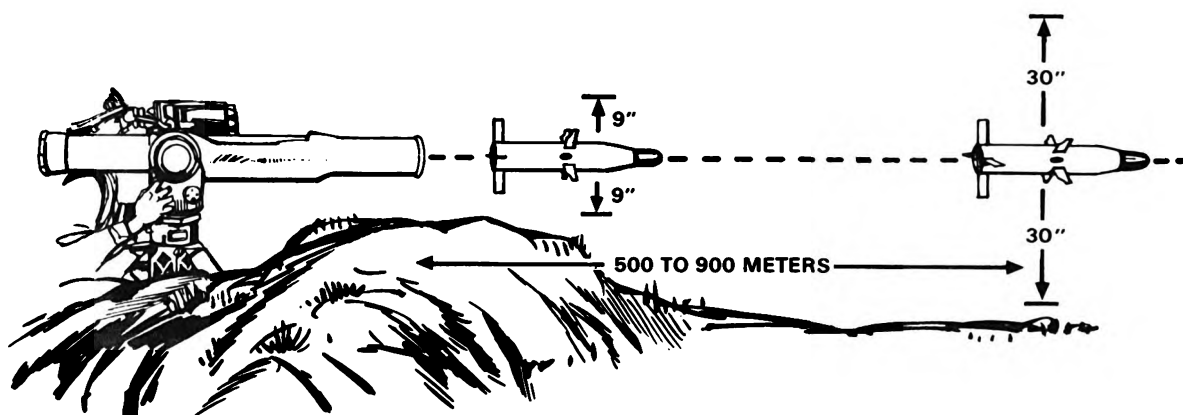
d. **Noise.** All personnel in the room must have double ear protection to prevent hearing loss. Earplugs and combat vehicle communications (CVC) helmets provide such protection.

## 7. CLEARANCE REQUIREMENTS (figure 3).

a. For muzzle clearance, there must be at least 9 inches of clearance at the end of the launch tube. This is so that the wings and control surfaces will not be damaged when they extend after the missile clears the launch tube.

b. The muzzle of the launch tube must extend beyond the enclosure, window sill, or aperture.

c. There must be at least 30 inches of clearance between your line of sight and any obstruction from 500 to 900 meters downrange. This is required because the missile may fly below the gunner's line of sight between 500 and 900 meters. A 30-inch line of sight clearance will insure a very high chance that the missile will not hit the ground on its way to the target.



*Figure 3. Clearance requirements.*

## REFERENCES:

None

## TASK NUMBER: 071-316-2503

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**LOAD, ARM, AND UNLOAD AN ENCASED TOW MISSILE**

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**CONDITIONS:**

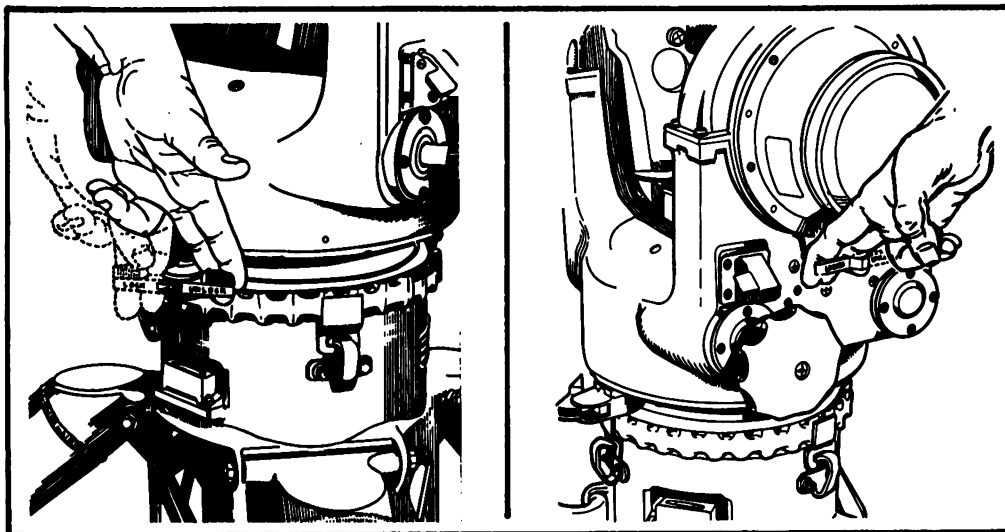
You are the loader, given an assembled TOW launcher and an encased missile with the forward handling ring and the electrical connector dust cover installed, and a sector of fire. This is a team task; the gunner will assist the loader in the unloading procedures. **For training, use missile simulation round instead of encased missile.**

**STANDARDS:**

Load, arm, and unload the launcher IAW the performance measures.

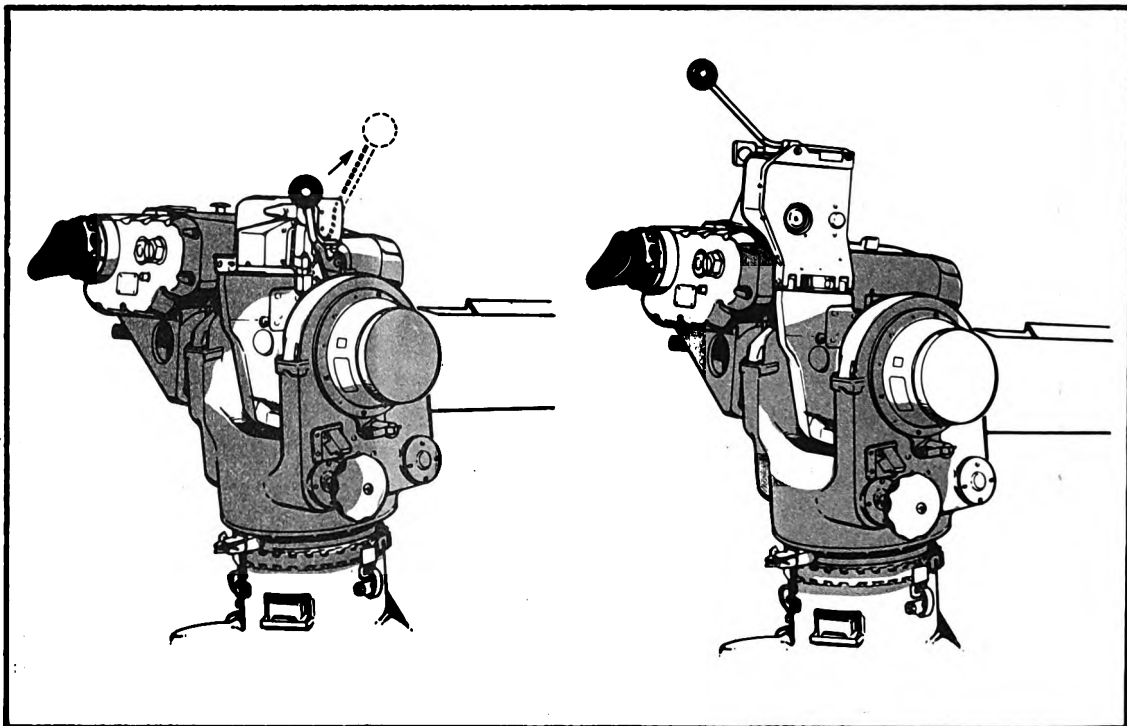
**PERFORMANCE MEASURES:****1. LOADING THE LAUNCHER.**

- a. Lock the azimuth and elevation locks so that the launch tube is in the 8-degree down position (figure 1).

**a. LOCKING THE AZIMUTH LOCK****b. LOCKING THE ELEVATION LOCK**

*Figure 1. Locking the azimuth and elevation locks.*

- b. Raise the bridge clamp and insure that the trigger protective cover is down (figure 2).

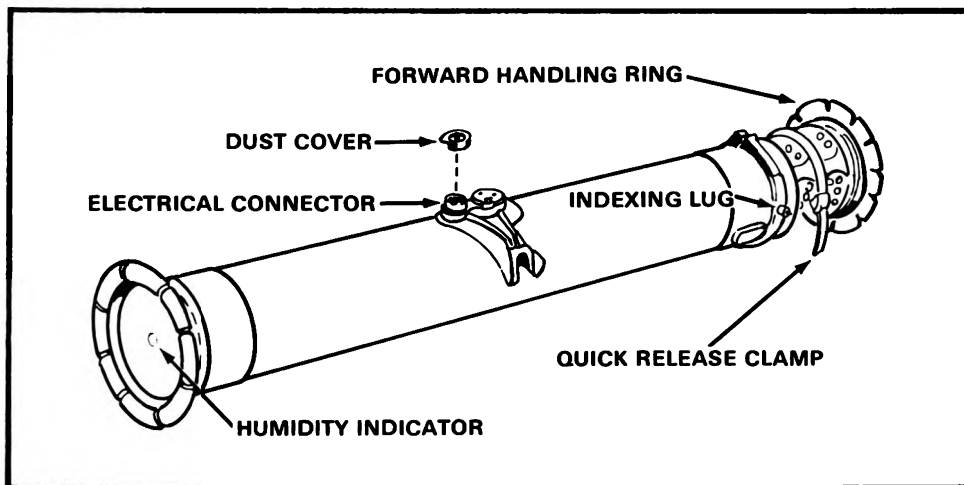


*Figure 2. Raising the Bridge Clamp*

- c. Check the encased missile prior to use for:
- (1) Gouges, punctures or cracks.
  - (2) Humidity indicator is blue.
  - (3) Diaphragm is not ruptured.
  - (4) Damaged indexing lugs.
- d. Pick up the missile (do not lift by handling rings). Remove the dust cover, quick release clamp, and forward handling ring, in that order.

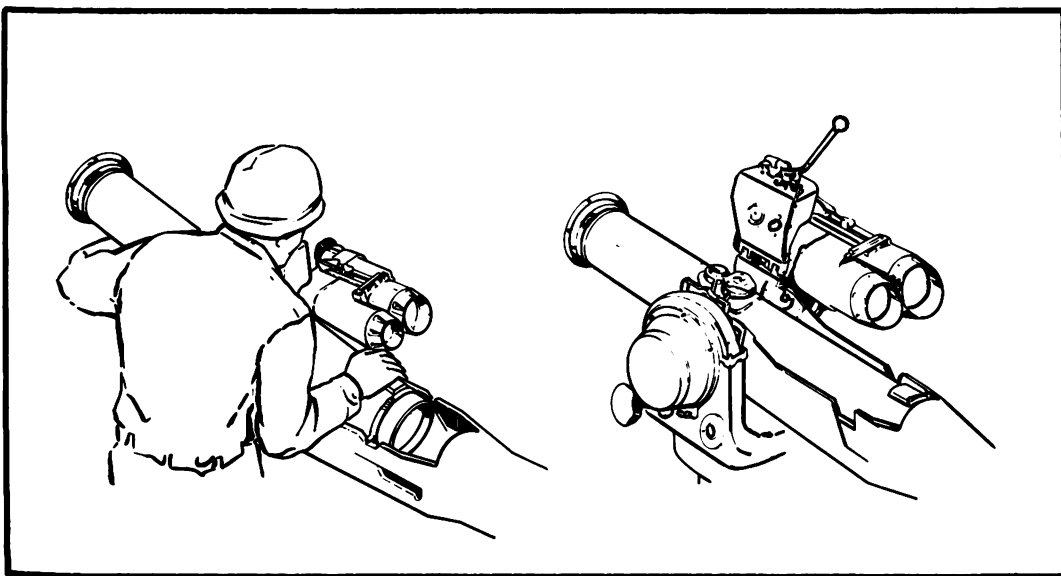


**NOTE:** For training purposes, check the humidity indicator before loading each round.



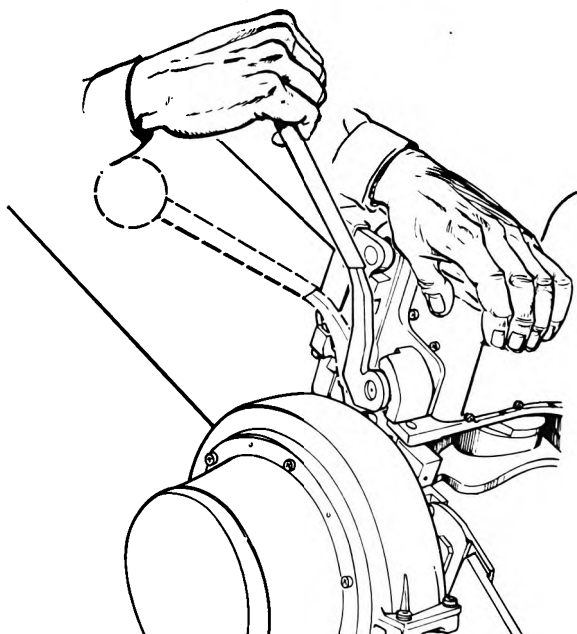
*Figure 3. Encased TOW missile.*

e. With the electrical connector facing up, hold the encased missile with the back end raised to about 45 degrees and insert the indexing lugs into the launch tube indexing slots. Slide the encased missile forward and down until it is well seated (figure 4).



*Figure 4. Seating the missile.*

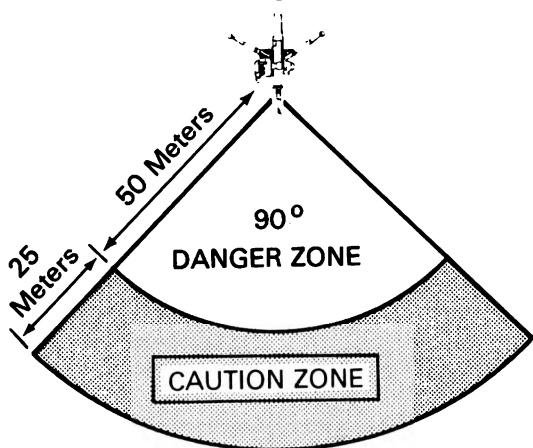
- f. To lower the bridge clamp. Push down on top of the bridge clamp with one hand and close the locking handle with the other hand (figure 5).



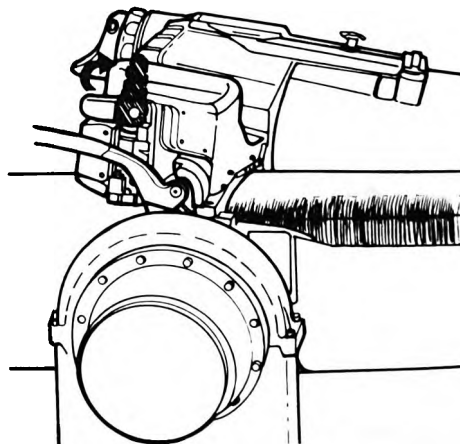
*Figure 5. Lowering the Bridge Clamp*

## 2. ARMING THE LAUNCHER.

- a. Clear the backblast area (figure 6).
- b. Raise the arming lever (figure 7).
- c. Give the gunner "UP".



*Figure 6.  
Backblast area of the TOW.*



*Figure 7.  
Arming lever.*

**3. UNLOADING THE LAUNCHER.** The procedures for unloading the launch tube depends on whether the missile was fired or not.

**a. Missile Fired.**

**(1) Gunner.**

**(a) Lower the trigger protective cover.**

**(b) Lock the azimuth lock and the elevation lock as the launch tube is in the 8-degree down position.**

**(2) Loader.**

**(a) Raise the locking handle and open the bridge clamp. (This action will cut the command-link wires and turn off the motor in the sight.)**

**(b) Lift the back end of the missile container and remove it from the launch tube. (If the wires were not cut, cut them manually and then check the batter (self-test position 1).)**

**(c) Clear the launch tube of any foreign matter.**

**b. Missile Not Fired.**

**(1) Gunner.**

**(a) Lower the trigger protective cover.**

**(b) Lower the arming lever.**

**(c) Lock the azimuth lock and the elevation lock so the launch tube is held in the 8-degree down position.**

**(2) Loader.**

**(a) Raise the locking handle and open the bridge clamp.**

**(b) Lift the back end of the encased missile and remove it from the launch tube.**

**(c) Replace the forward handling ring and clamp, and the electrical connector dust cover.**

**(d) Secure the encased missile in the missile rack. Tag missile with date opened, unit, and name.**

**REFERENCES:**

**TM 9-1425-470-12, Operator's and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapons System, C5, Jan 74.**

**TEC Lesson 948-071-0024-F, Loading, Tracking and Firing the TOW**



**TASK NUMBER: 071-316-2505**

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**DETERMINE IF A TARGET CAN BE ENGAGED BY TOW**

---

**CONDITIONS:**

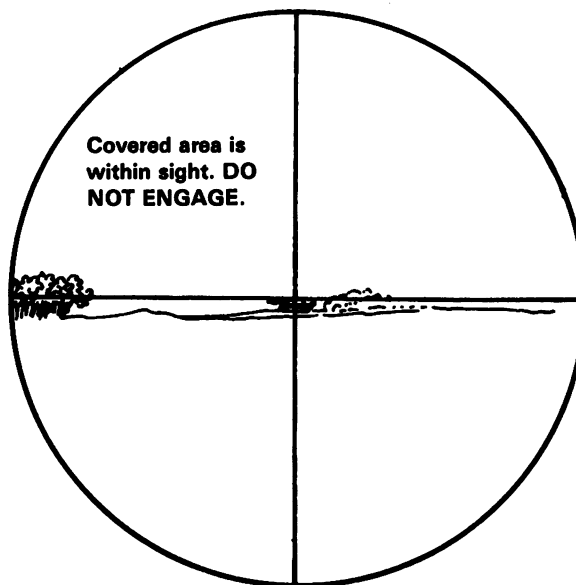
Acting as a TOW gunner, or squad leader, given a complete TOW launcher and binoculars.

**STANDARDS:**

1. As a TOW gunner, using the daysight tracker, specify whether a vehicle is engageable.
2. As a TOW squad leader, using binoculars, specify whether a vehicle is engageable.

**PERFORMANCE MEASURES:**

1. Using the daysight tracker.
  - a. You can use the daysight tracker to determine if you have enough time to engage a moving target (figure 1).



*Figure 1.*

- b. The daysight tracker is based on a vehicle speed of 35 kmph or 10 meters per second. This is expected to be the top cross-country speed of armored fighting vehicles.

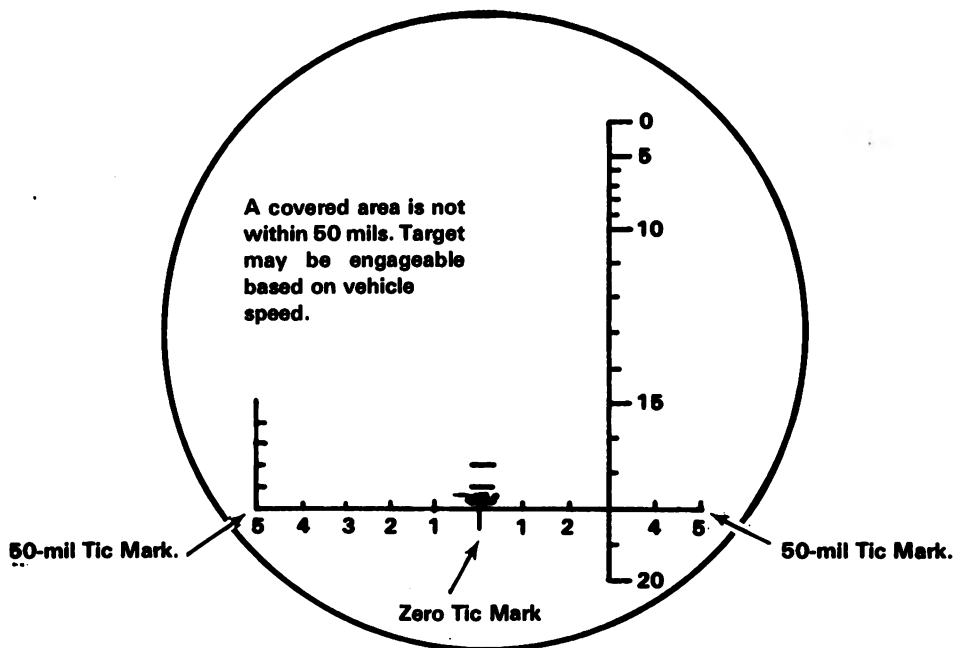
c. Place the crosshairs on the center of visible mass of the target. If the area between the vertical crosshair and the edge of the sight, in the direction of travel, is clear of obstructions, the target can be engaged.

## 2. Using binoculars.

a. You can also use the binocular reticle to determine if there is enough time to engage a moving target. This technique is usually used by squad leaders.

b. Place the zero tic marks of the horizontal line at the center of the target (as in figure 2 below). If the area between the target and the 50-mil tic mark, in the direction of travel, is clear of obstructions, the target can be engaged.

**NOTE:** The 50-mil tic marks are located at each end of the horizontal line and are labeled 5.



*Figure 2. Binocular Sight Reticle*

c. The optical sight and binocular techniques are only estimates. Vehicles moving at speeds slower than 35 kmph may be engaged even though half the sight picture, or 50 mils in the binoculars, is not clear of obstructions. Proper training will enable you to make adjustments for different vehicle speeds.

## REFERENCES:

None

**TASK NUMBER: 071-316-2519****ENGAGE A TARGET WITH A TOW****CONDITIONS:**

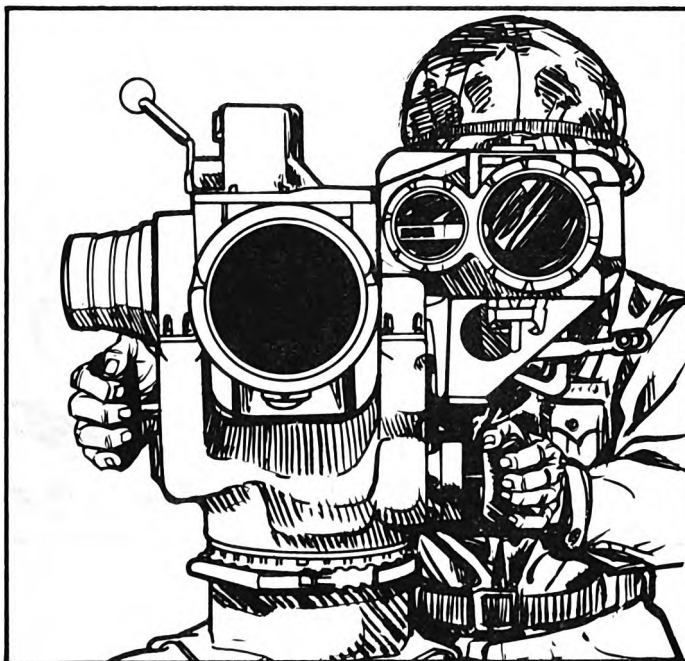
Given a loaded and armed TOW weapon system correctly positioned for firing, a sector of fire, an engageable target entering the sector of fire within TOW range, and proper squad leader fire commands (using command "FIRE").

**STANDARDS:**

1. Acquire and track the target upon being given the target identification/location.
2. Fire the missile upon being given the command of "FIRE", IAW performance measure 4c.

**PERFORMANCE MEASURES:**

1. Place your eye well into the rubber eyepiece.
2. Place both hands firmly on the control knobs, as shown in figure 1.



*Figure 1.*

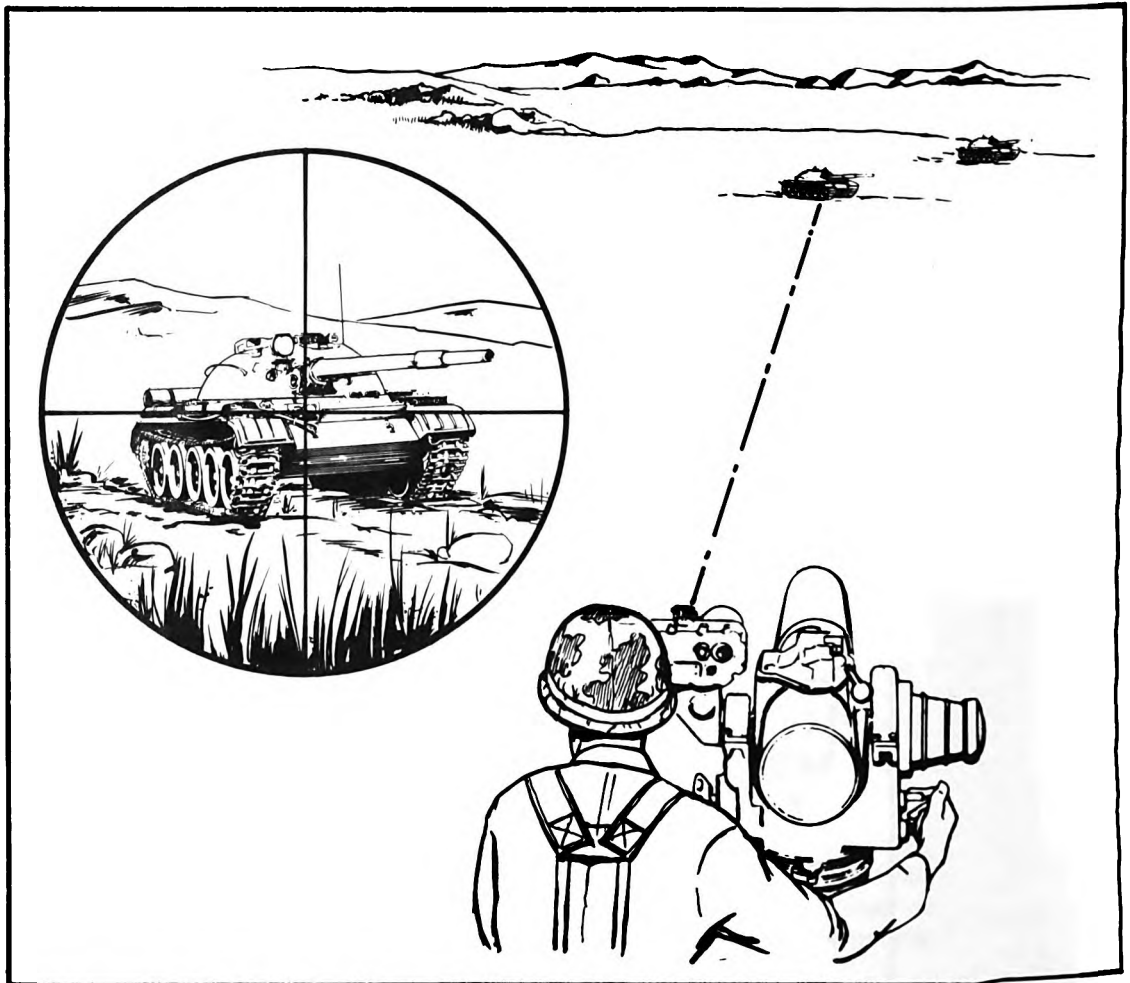
2-V-A-9.1

3. Situate your body so there is no contact between the shoulder and the encased missile. Your only contact with the launcher is with the hands and eye. Assume a firing position that is comfortable. An uncomfortable position causes muscle tension that affects your ability to track smoothly.

**NOTE:** When firing from the ground, you should kneel on one or both knees.

#### 4. ACQUISITION, TRACKING, AND FIRING.

a. Acquisition. Once a target is sighted, acquire it in the optical sight, raise the trigger protective cover, and establish a smooth tracking rate while keeping the crosshairs on center of visible mass of the target (figure 2).



*Figure 2.*



b. Tracking.

(1) To move the launch tube left or right, apply a smooth steady force to both control knobs by pushing one and pulling on the other and rotating your body from the waist up as the launcher moves.

(2) To elevate or depress the launch tube, apply a smooth, steady twisting force to both control knobs. Applying pressure to only one control knob, or uneven pressure, makes it more difficult to track smoothly.

(3) Maintain the same arm, shoulder, and head position throughout an engagement. Any change in body position other than leaning with the controls will cause a jerking motion. This could result in an erratic maneuver and possible ground impact after the missile is fired.

c. Firing.

(1) Take a deep breath and let part of it out just before pressing the trigger. Proper breath control is particularly important during the first and last 400 meters of missile flight. Improper breathing will cause you to track poorly.

(2) Once the trigger is pressed, there is a 1.5-second delay before the missile is launched. This delayed firing of the launch motor can cause you to flinch or jerk the control knobs if you aren't prepared for it.

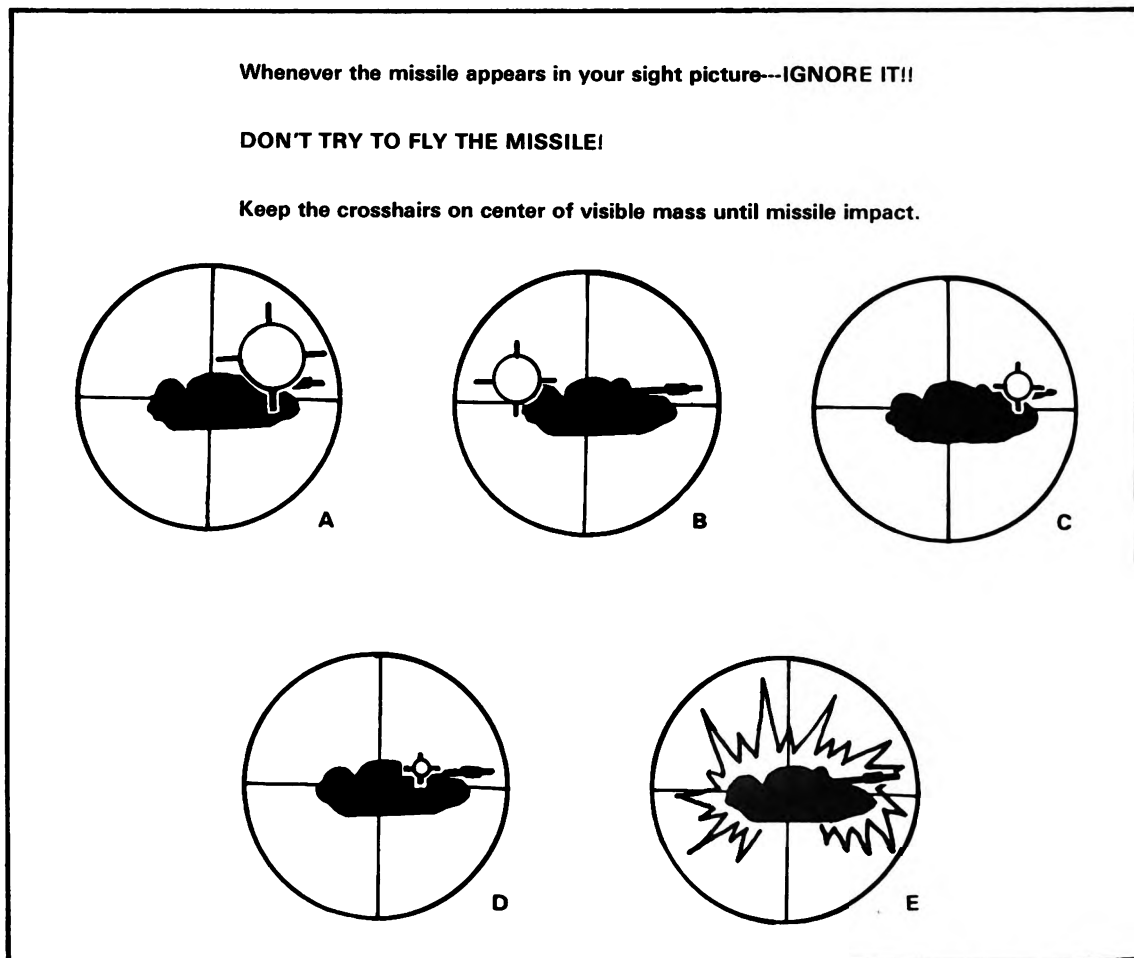
(3) There are two noises you should be prepared for once you press the trigger:

-The first noise is a "POP." This is the gyro being activated. It is not loud, but it may cause you to think a misfire has occurred and you may not be prepared for the next noise.

-The second noise is the launch motor firing. This is a loud noise similar to the LAW firing.

(4) One effect caused by the firing of the launch motor (other than noise) that can be distracting is the backblast. The dust, smoke, heat, and debris from the backblast may cause you to flinch.

(5) When the missile appears in the sight picture (figure 3), ignore it. Never try to fly the missile. If you are distracted, your tracking becomes poor and your chances of hitting the target are reduced. Continue to track the target at a smooth tracking rate keeping the crosshairs on the center of visible mass until missile impact.



*Figure 3.*

## REFERENCES:

TEC Lesson 948-071-0024-F, Loading, Tracking and Firing the TOW

## TASK NUMBER: 071-316-2504

## PERFORM IMMEDIATE ACTION FOR A TOW MISFIRE

## CONDITIONS:

Given an assembled and loaded ground mounted TOW launcher (ready to fire), two encased missiles and a misfire situation (missile fails to launch 1.5 seconds after trigger is pressed). This is a team task. You will be assisted by at least one other squad member.

**NOTE:** For training, use missile simulation round instead of encased missile.

## STANDARDS:

Perform the immediate action in sequence that would allow a gunner to continue engagement of a target.

## PERFORMANCE MEASURES:

1. Take immediate action procedures to eliminate the malfunction and continue the mission in the fastest and safest manner.
2. Always remember, when a misfire occurs, that it could be a delay in the firing circuits.
3. Immediate action procedures for a misfire. Listed below are the actions that the gunner and loader take in the event of a misfire.

## Misfire Procedures

Gunner	Loader	Corrective Action
1. Press the trigger again.		If the missile fails to fire, perform step 2.
2. Alert the crew by saying "Misfire" and continue to track.	a. Check battery power (self-test position 1).	(a) Out-of-band reading: the loader replaces the battery.
		(b) In-band reading: the loader proceeds to step 2b.

Gunner	Loader	Corrective Action
<p>3. Attempt to fire. (If missile fails to fire, call "Misfire").</p> <p>5. Attempt to fire. (If missile fails to fire, call "Misfire").</p> <p>6. Close trigger protective cover. Place the launch tube in the 8 degree down position, locking the azimuth and elevation locks.</p>	<p>b. Check coil cord connection to missile guidance set.</p>	<p>(a) Press down on coil cord connection, checking for proper seating.</p>
	<p>(b) Tighten coil cord connection to missile guidance set. Loader proceeds to step 2c.</p>	
	<p>c. Check bridge clamp locking handle.</p>	<p>Insure bridge clamp is properly seated. Proceed to step 2d.</p>
	<p>d. Lower and raise the arming lever.</p>	<p>Give the gunner "UP". Gunner and loader perform steps 3 and 4.</p>
	<p>4. Lower and raise arming lever.</p>	<p>Give the gunner "UP". Gunner performs step 5.</p>
		<p>Gunner and loader perform step 6.</p>
	<p>a. Lower the arming handle.</p>	<p>Proceed to step 7.</p>

Gunner	Loader	Corrective Action
7. Wait for fire command from squad leader.	b. Open the bridge clamp and remove the encased missile.  c. Conduct a missile pre-op.  d. Load another missile.	Start a new mission.
Wait for fire command from squad leader.		

**WARNING**

**Remain clear of front and rear of the launcher at all times.**

**SQT ADMINISTRATIVE INSTRUCTIONS:**

This task may be tested on the SQT in the Hands-on Component (HOC). The soldier will be required to perform in the misfire procedures within 1 minute. There will not be a requirement to replace the battery.

**REFERENCES:**

**TEC LESSON 948-071-0024-F, Loading, Tracking and Firing the TOW**

**TM 9-1425-470-12, Operator's and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapon System, Jan 74, C1-6**



**TASK NUMBER: 071-316-2521**

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**PREPARE AN ANTIARMOR RANGE CARD (TOW)**

---

**CONDITIONS:**

In a field environment, given a TOW weapon system, a fighting position (designated as primary, alternate, or supplementary), a sector of fire, target reference points and probable targets engagement areas, pencil and paper, and lensatic compass.

**STANDARDS:**

Within 10 minutes, prepare a range card for a TOW that illustrates a representative sketch of the terrain and includes as a minimum:

1. The weapon position indicated by the proper weapon symbol (ⒶTOW).
2. Distance and azimuth plotted from a known point to the weapon position.
3. Assigned sector of fire showing complete boundaries.
4. Maximum engagement line.
5. Deadspace within the sector of fire.
6. Azimuth and range to target reference points (TRP) and/or anticipated target engagement areas.
7. Magnetic north arrow (properly oriented).
8. Marginal information
  - a. Firing position designation (primary, alternate, or supplementary).
  - b. Unit designation (no higher than company).
  - c. Date/time group.

**PERFORMANCE MEASURES:**

1. A range card is a sketch of the terrain that a weapon has been assigned to cover by fire. It contains information which assists in the planning and controlling of fire, in the rapid detection and engagement of targets, and in the orientation of replacement personnel or units. By using a range card, you can quickly and accurately determine the information you need to engage targets.

**2. Sector of Fire.** A sector of fire is a portion of the battlefield within which you are responsible to engage targets with your weapon. A sector of fire can be of any shape or size. Leaders assign sectors of fire to insure that no matter where a target approaches, there will be a weapon positioned which can engage it. The following terms are used in conjunction with sector of fire.

**a. Anticipated Target Engagement Areas.** Your leader may also designate anticipated target engagement locations within your sector of fire. These are recognizable terrain features on or near likely enemy avenues of approach.

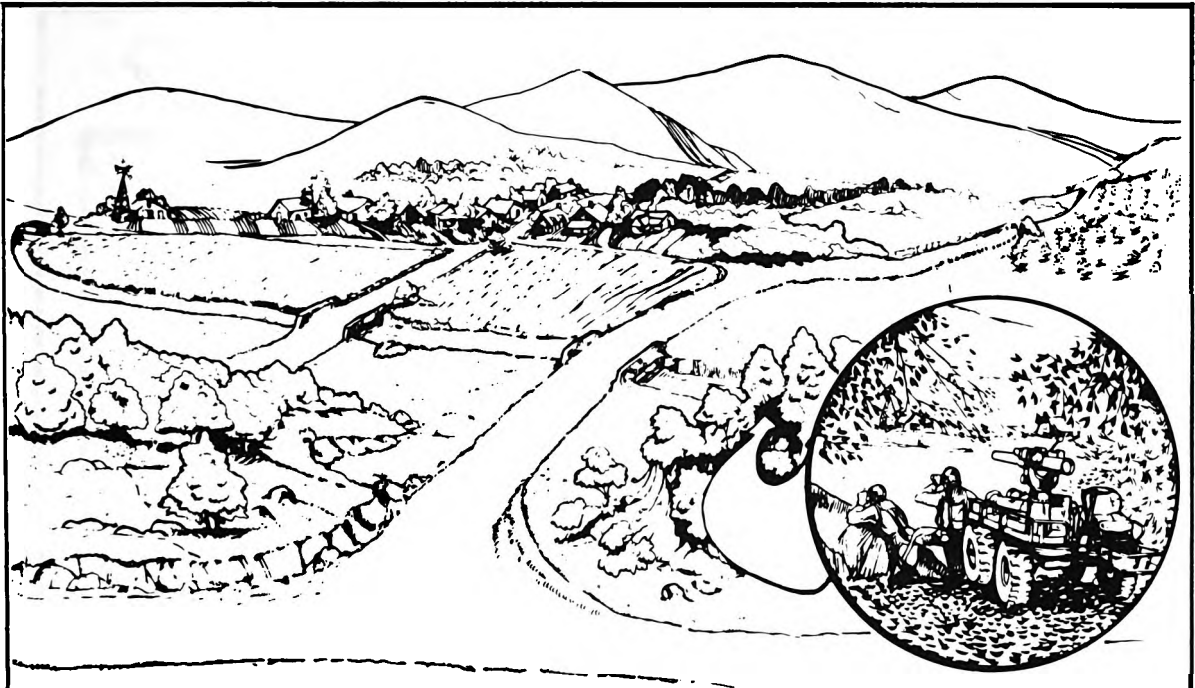
**b. Target Reference Points. (TRP).** TRPs are natural or manmade terrain features which can be used as reference points for locating targets and controlling direct fires. TRPs are designated by a specific letter or number (or a combination). If there are TRPs in or near your sector of fire, your leader will point them out and tell you the designation. If he does, they are shown on your range card.

**c. Deadspace.** Deadspace is an area or areas where direct fire weapons cannot hit. The area behind houses, hills, or within orchards, for example, is deadspace. All deadspace in your sector(s) of fire must be determined because your leaders need to plan other types of fire (mortars, artillery, mines, etc.) to cover the area. Deadspace is indicated on your range card by a series of parallel lines, or the word "DEADSPACE."

**d. Maximum Engagement Line.** The maximum engagement line is a line beyond which a target cannot be engaged. This line may be closer than the maximum engagement range of the weapon. Both the terrain and the maximum engagement range of your weapon will determine the path of the maximum engagement line.

**3. After your leader shows you where to position your TOW, he will indicate your sector of fire by pointing out the portion of the terrain for which you are responsible. He will do this by giving you boundaries located between prominent terrain features, or by left and right limits indicated by terrain features or azimuths. If necessary, he may also assign you more than one sector of fire and will designate one as primary and the other as secondary.**





### EXAMPLE OF A SQUAD LEADER'S BRIEFING

Our mission is to cover a sector of fire that begins here and goes in the direction of the windmill to maximum engagement range; it extends to the right across the high ground behind the houses, and hill, to the right edge of the orchard and returns here. The enemy should approach from north and will probably use both Mace Road and Tepe Road to enter our sector. We must plan on engaging the enemy in this area as soon as he is within range. There is one target reference point within our sector. It's the junction of Toad and Mace Roads. That's it there, in front of that group of houses. Label the road junction TRP 6. We'll use the road junction to our left rear as the reference point to locate our position.

**NOTE:** The instruction on range card preparation contained in this task is based on this example.

4. Preparation of the range card is based on the following considerations and procedures.

a. Once your leader has given you the necessary information, (see example), you can begin preparing your range card, depending upon the priority of other jobs you must perform, such as preparing and camouflaging your firing position. If you are assigned alternate and supplementary firing positions, a range card is required for them also.

b. Procedure:

(1) In the lower center of your range card, indicate your firing position by drawing the symbol of your TOW. Then draw and label your sector sketch. Draw roads, bridges, buildings, streams, hills, woods, etc. Be as accurate as you can (figure 1).



(3) Now draw in your sector. This is an enclosed line that outlines your sector of fire. The maximum engagement line is a segment of the sector line and indicates the maximum range that targets may be engaged (figure 3).

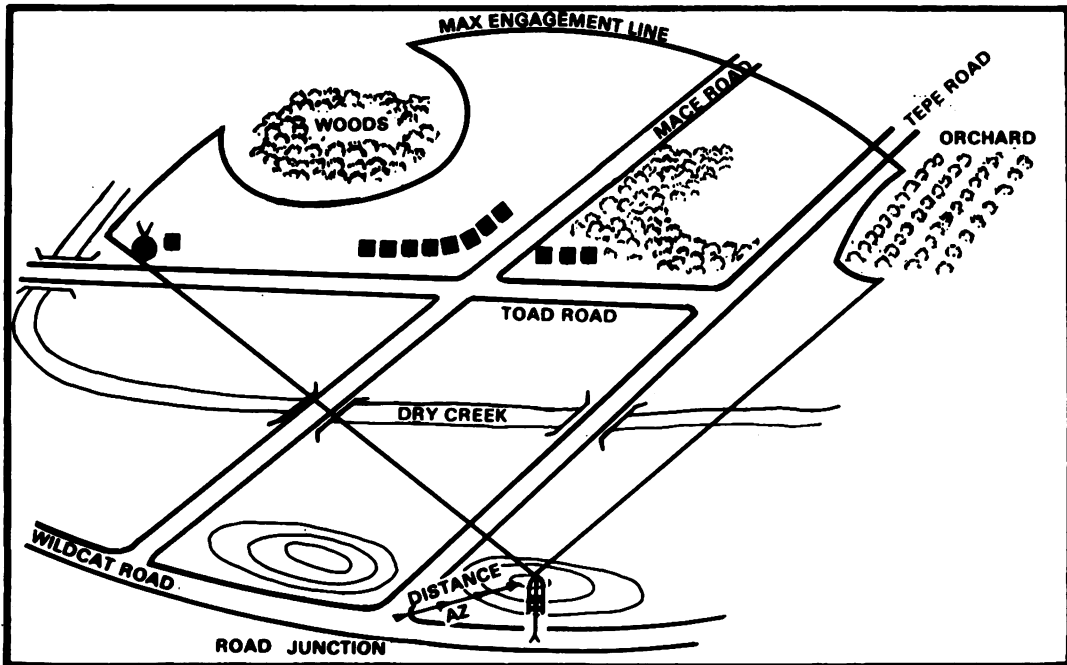


Figure 3

(4) Draw in the deadspace in your sector. Be sure and indicate by an enclosed line, containing parallel lines, those areas you cannot hit. You can also write the word "DEADSPACE" (figure 4).

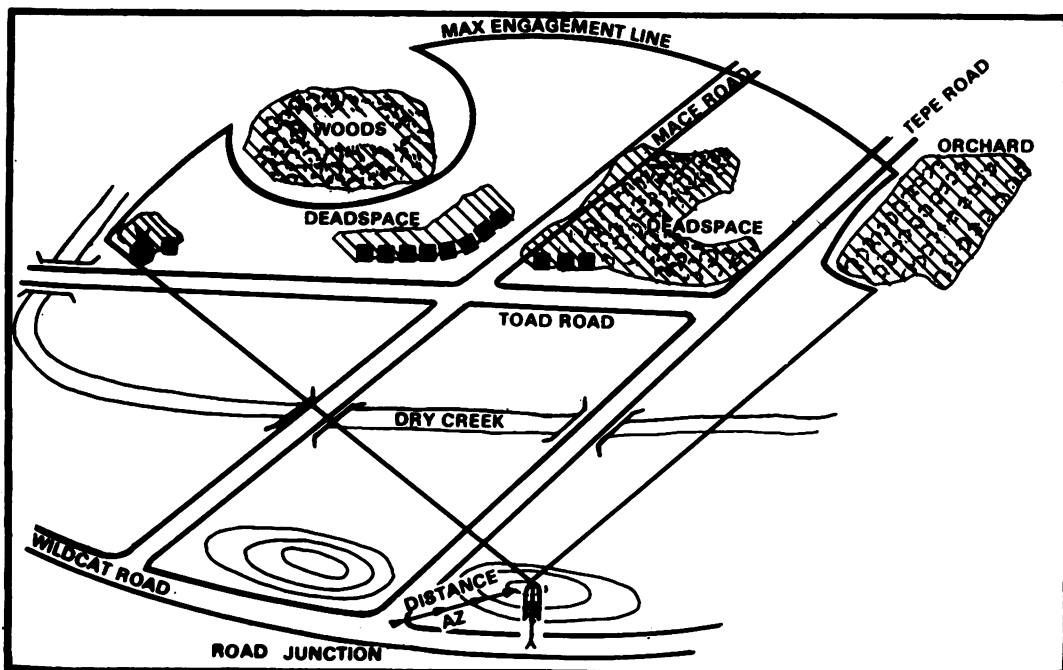


Figure 4

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(a) Type position (primary, alternate, supplementary).

(b) Unit description — Never indicate your unit higher than your company. The enemy will not be able to learn important military information if they find your range card.

(c) Date/time group ( the actual time you completed the range card).

(7) Your range card is now finished. The range card you construct for your sector of fire will not look the same as the one in this task. However, the basic information and method of construction presented in this task is the same when preparing a TOW range card.

(8) Make two copies of each range card prepared. Keep one copy at your firing position. The second copy will normally be picked up by your squad or section leader for preparation of fire plans and coordination of fires.

**REFERENCES:**

**TEC Lesson 948-071-0029-F, Preparation of TOW and Dragon Range Cards**



**TASK NUMBER: 071-316-2602**

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**SUPERVISE COMBAT LOADING OF PERSONNEL  
AND EQUIPMENT IN ORGANIC VEHICLE**

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**CONDITIONS:**

Given an M901, M113A1, M151A1, M274, a squad-size element, a loading plan (SOP), and equipment authorized to be loaded (per unit SOP).

**STANDARDS:**

Organize and position personnel and authorized equipment on the vehicle IAW unit loading plan (SOP).

**PERFORMANCE MEASURES:****GUIDE FOR COMBAT LOADING.**

1. Combat loading is a logical sequence of placing your squad's ammunition and equipment on the outside and inside of the vehicle. Sleeping equipment and other low-use items will be placed in first, and high-use items such as ammunition will be placed in last.

2. An SOP for combat loading is usually established by the company or section. Refer to the existing unit SOP for placement of ammunition and equipment inside the vehicle. All members of the squad should know where each item is placed.

3. A listing and diagram for placement of basic issue items for the —

- a. M151 can be found in TM 9-2320-218-10.
- b. M274 can be found in TM 9-2320-246-10.
- c. M901 can be found in TM 9-2350-259-10.
- d. M113A1 can be found in TM 9-2300-257-10.

**REFERENCES:**

TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (app E, pages E-1 thru E-4)  
TM 9-2320-218-10, Operator's Manual for Truck, Utility: ¼-Ton, 4X4, M151, M151A1, M151A2, Aug 78 (app B, pages B-1 thru B-10)  
TM 9-2320-246-10, Operator's Manual: Truck, Platform, Utility, ½-Ton, 4X4, M274, Apr 67 (app B, pages B-1 thru B-5)  
TM 9-2320-259-10, Operator's Manual: Combat Vehicle, Antitank, Improved TOW Vehicle, M901





**TASK NUMBER: 071-316-2603**

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**SUPERVISE CONSTRUCTION AND CAMOUFLAGE  
OF A TOW FIGHTING POSITION**

---

**CONDITIONS:**

In day or night, given a TOW crew with load bearing equipment (bayonet w/scabbard, entrenching tool, and poncho), individual weapon, TOW weapon system with encased missile, the specific position for weapon location, a sector of fire, and pioneer tools.

**NOTE:** For training, use missile simulation round instead of encased missile.

**STANDARDS:**

Supervise the construction and camouflage of a TOW position to meet the following specifications:

1. Position allows squad to engage the enemy in assigned sector of fire.
2. It provides protection for both the weapon and the crew.
3. The size and shape is IAW the performance measures.
4. Position blends with surroundings so that it cannot be easily detected 35 meters to the front (hand-grenade range) and cannot be seen from the air (spoil is covered with grass, leaves, etc., to blend with the surrounding vegetation).

**PERFORMANCE MEASURES:****1. CONSTRUCTING THE POSITION.**

a. First, assemble the launcher on position and clear fields of fire. Then while insuring the sector is observed, outline position and start digging.

b. Dig the weapon's position first and add overhead protection for the crew and missiles as time allows. Dig a position 24 inches deep, as in figure 1.



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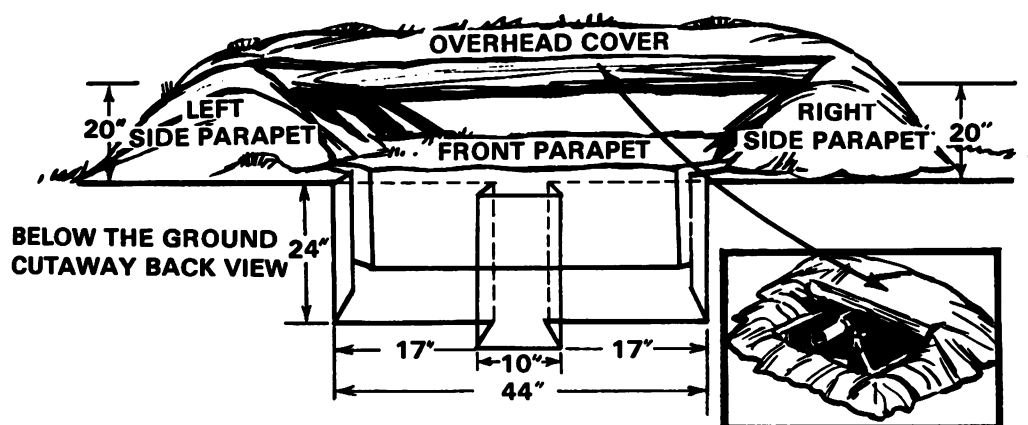


Figure 2.

## 2. CAMOUFLAGING THE POSITION.

a. Place sod from the position on the parapet in such a manner that it looks natural and will have a good chance of growing.

b. Cover all fresh dirt with leaves or brush so it blends with the ground around the position.

c. If additional vegetation must be used to break up the outline of the parapet, get it (similar to that found near the position) from far to the rear of the position with root structure intact, if possible. Do not use so much vegetation that the position has more than the surrounding area. Camouflage the holes or cuts from which vegetation was removed.

d. If the position is covered, camouflage it in the same manner as the parapet. If it's not covered, camouflage the position using camouflage nets or available brush, branches, etc., so that it is not visible from above.

e. Replace foliage, if it begins to change color. Attempt to get sod, small trees, plants, etc., used as camouflage to grow, so that the position will improve as time passes. Remember, the position can always be improved.

f. Approach the position only from the rear, insuring that a visible trail is not left. Cover all footprints around and leading into and out of the position so they do not point out the position.

g. Do not litter the area nor make unnecessary noise during constructing or camouflaging the position.

h. Do not disturb vegetation not used in constructing or camouflaging the position. The area around the position should look as natural as possible.

### 3. KNEELING THE LAUNCHER.

If being suppressed by an enemy weapon and there is need to further conceal the system, the gunner can kneel (lower) the launcher below ground level.

#### a. To kneel the launcher:

(1) Have the gunner hold up on the encased missile with his right shoulder.

(2) Release the friction locking handle and detent stop on the rear leg and allow the rear leg to slide back into its notch. The launcher will move back by its own weight.

(3) Depress and lock the launch tube in the full DOWN position so it does not stick above the frontal protection.

#### b. To raise the launcher:

(1) Lift on the rear of the encased missile and push forward and down on the rear leg. (Elevation and azimuth locks must be engaged.)

(2) Check the level indicators and lock the friction locking handle.

4. **VEHICLE-MOUNTED TOW.** A fighting position for a vehicle-mounted TOW is a hull-defilade position with a camouflage net erected over the position.

a. The position should look natural and blend with the surrounding terrain. It should not be detected from 35 meters to the front (figure 3).



Figure 3.

b. Be particularly careful with a vehicle to insure that the vehicle does not leave a trail pointing out the position. This is an obvious telltale sign that aerial observers look for. All tracks should be covered.

c. The camouflage techniques for the ground-mounted position apply to the vehicle-mounted position also.

#### **5. AFTER CAMOUFLAGING.**

a. Insure that the ground behind the TOW (about 25 meters) is free of leaves and dirt so the backblast from the weapon does not leave a signature.

b. Do not leave any evidence of digging. Do not leave equipment laying around. Everything must be concealed or camouflaged.

c. If possible, move to the front of the position, at least 35 meters, and study it. Insure that the position looks natural and blends with its surroundings.

#### **REFERENCES:**

None



**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION VI**  
**TACTICAL VEHICLES**

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**TASK SUMMARIES**





**TASK NUMBER: 071-333-6001**

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**DRIVE A WHEELED VEHICLE CROSS-COUNTRY**

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**CONDITIONS:**

Given one of the following vehicles:

1. Truck, utility,  $\frac{1}{4}$ -ton, M151A1, A2.
2. Truck, cargo,  $1\frac{1}{4}$ -ton, M715.
3. Truck, cargo,  $1\frac{1}{4}$ -ton, M561.
4. Truck, platform, utility,  $\frac{1}{2}$ -ton, M274.

Given also the requirement to drive across varying terrain which includes the following obstacles:

1. More than 30% side slope.
2. 60% or less grade.
3. 30% or less side slope.
4. More than 60% grade.
5. Extremely sandy or muddy terrain.

**STANDARDS:**

Bypass all obstacles where possible, negotiate obstacles 2, 3, and 5 when they cannot be bypassed, and inform the vehicle commander and follow his instructions when obstacles 1 and 4 are encountered and cannot be bypassed.

**PERFORMANCE MEASURES:**

**Operation of the transmission and transfer case.** (See figures 1, 2, and 3.)

1. Shifting the M151 from 2-wheel drive. If the vehicle is moving, slow to a speed not exceeding 4 to 5 mph, depress the clutch, and shift the front axle drive lever to the forward (IN) position. The M151 automatically goes into low range upon engagement of the front axle drive (figure 1).

2. Shifting the M151 from 4-wheel to 2-wheel drive. If the vehicle is moving, slow to a speed not exceeding 4 to 5 mph, depress the clutch, and shift the front axle lever to the rear (OUT) position (figure 1).

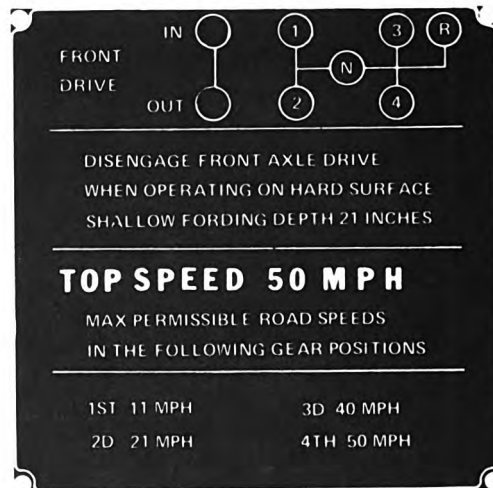


Figure 1. M151 Series.

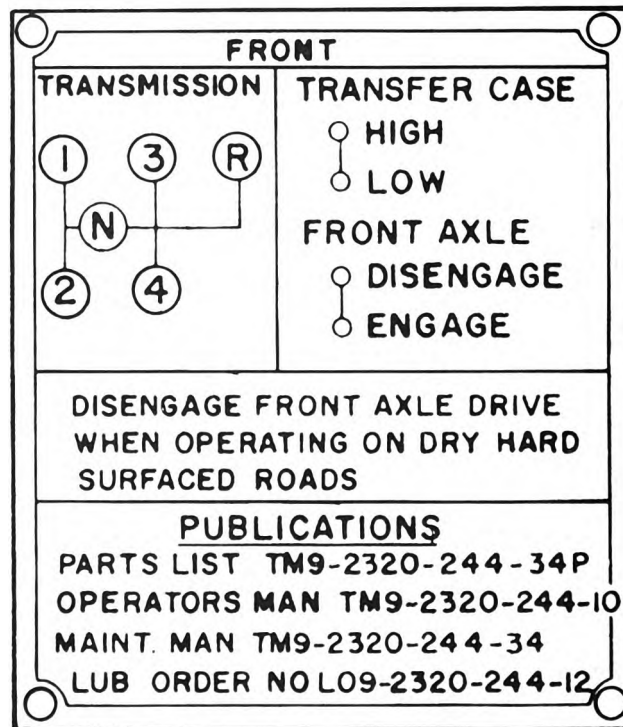


Figure 2. M715 Series.

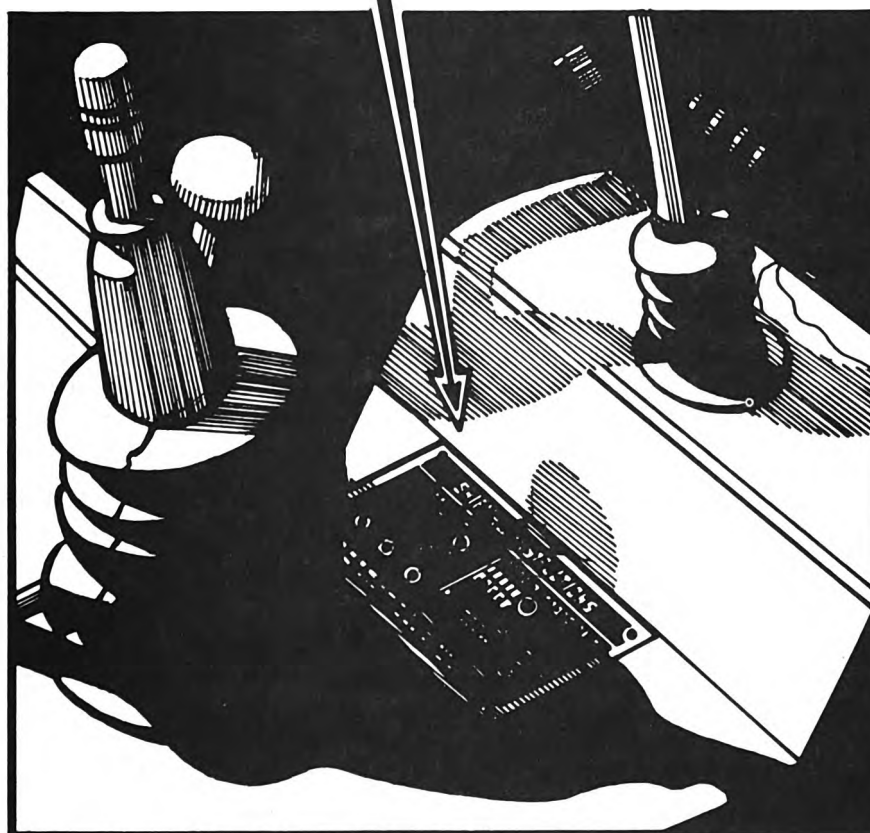
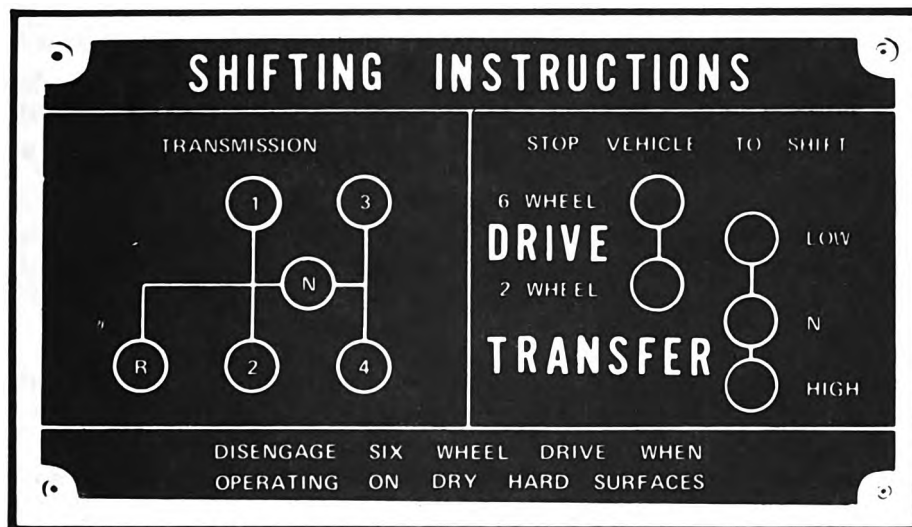


Figure 3. M561.

3. Shifting the M715 from 2-wheel drive to 4-wheel drive. Let up on the accelerator if the vehicle is moving, depress the clutch, and shift the front axle drive lever to the rear (ENGAGE) position (figure 2).

4. Shifting the M715 from 4-wheel drive high range to 4-wheel drive low range. Slow the vehicle to a speed not exceeding 4 to 5 mph, depress the clutch, and move the auxiliary range lever to the rear (LOW) position (figure 2).

5. Shifting the M715 from 4-wheel drive low range to 4-wheel drive high range. Slow the vehicle to a speed not exceeding 4 to 5 mph, depress the clutch, and move the auxiliary range lever to the forward (HIGH) position (figure 2).

6. Shifting the M715 from 4-wheel drive to 2-wheel drive. Let up on the accelerator if the vehicle is moving, depress the clutch, and shift the front axle drive lever to the forward (HIGH) position. The auxiliary range lever must be in the forward (HIGH) position before the front axle drive can be disengaged (figure 2).

7. Shifting the M561 from 2-wheel to 6-wheel drive. Stop the vehicle, depress the clutch, and move the range selector lever to the forward (6-wheel) position (figure 3).

8. Shifting the M561 from 6-wheel drive high range to 6-wheel drive low range. Stop the vehicle, depress the clutch, and move the range selector lever to the forward (LOW) position (figure 3).

9. Shifting the M561 from 6-wheel drive low range to 6-wheel drive high range. Slow the vehicle to a speed not exceeding 4 to 5 mph, depress the clutch, and move the selector lever to the rear (HIGH) position (figure 3).

10. Shifting the M561 from 6-wheel drive to 2-wheel drive. If the vehicle is in high range, slow to a speed not exceeding 4 to 5 mph, depress the clutch, and move the selector lever to the rear (2-wheel) position. If the vehicle is in low range, stop, depress the clutch, and move the selector lever to the rear (2-wheel) position. Shifting from 4-wheel to 2-wheel drive will automatically place the vehicle in high range. Do not attempt to operate the vehicle in 2-wheel drive low range.

11. Shifting the M274. The M274 is shifted through the forward and reverse gears in the same manner as the M151. The following table shows maximum speeds in each gear:

GEAR	MAXIMUM SPEED HIGH RANGE (MPH)	MAXIMUM SPEED LOW RANGE (MPH)
First	8	4
Second	14	7
Third	25	13
Reverse	8	4

12. Shifting the M274 transfer gears from Neutral (N) to High (H) or Low (L) Range. The transmission shift lever must be in Neutral and the vehicle at a standstill.

**REFERENCES:**

**TM 9-2320-218-10, Operator's Manual for Truck, Utility, ¼-ton, M151, M151A1, M151A2, Aug 78**

**TM 9-2320-242-10, Operator's Manual for Truck, Cargo: 1¼-ton, 6X6, M561, Mar 77 (chap 1, page 1-23, para 1-6a(6))**

**TM 9-2320-244-10, Operator's Manual, Truck, Cargo: 1¼-ton, 4X4, M715, C1, Aug 68 (page 31-32)**

**TM 9-2320-246-10, Operator's Manual (M274) (chap 2, page 2-8 thru 2-9)**

**DA Pam 750-31, The M561/M792 Gama Goat**

**TEC Lesson 944-441-0012-F thru 0018-F**

**TEC Lesson 944-441-0019-F, Gamma Goat: 5 Wheel Operation**

**TEC Lesson 944-441-0020-F, Gamma Goat: Operation Under Unusual Conditions**



**TASK NUMBER: 071-333-6002**

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**DRIVE A WHEELED VEHICLE ON ROADS, IN VEHICLE PARKS, AND IN BUILT-UP AREAS**

---

**CONDITIONS:**

Given one of the following vehicles, and a requirement to drive on roads, in vehicle parks, and in built-up areas.

1. Truck, utility, ¼-ton, M151A1, A2.
2. Truck, cargo, 1¼-ton, M715.
3. Truck, cargo, 1¼-ton, M561.
4. Truck, platform, utility, ½-ton, M274A2, A3, A4, A5.

**STANDARDS:**

The individual will operate the vehicle IAW local traffic regulations, the rules of the road, and safety factors outlined in the unit SOP, TM 21-300, FM 21-305, AR 385-10, and AR 385-55.

**PERFORMANCE MEASURES:**

1. The unit SOP will provide information on vehicle operation, to include references to appropriate local regulations. Additional background and Army-wide operating procedures, as well as the most important international traffic signs, are given in references cited below.
2. Traffic controls such as signs, signals, devices, and markings are explained in TM 21-300, sec V, para 42, and in FM 21-305, chap 10.
3. The rules of the road are explained in TM 21-300, sec V, para 43, and in FM 21-305, chap 6, 7, 8, 9 and 11.
4. Safety is discussed in TM 21-300, sec VI, para 44. Additional safety requirements are outlined in AR 385-10 and AR 385-55.

**REFERENCES:**

**AR 385-10, Army Safety Program (chap 2, page 2-1, para 2-1 thru 2-3)**  
**AR 385-55, Prevention of Motor Vehicle Accidents (chap 2, page 2-0, para 3-1)**  
**FM 21-305, Manual for the Wheeled Vehicle Driver (chap 6, page 6-1 thru 6-5, para 6-1 thru 6-8)**  
**TM 21-300, Driver Selection and Training (Wheeled Vehicles) (chap 3, page 6, para 11; chap 4, page 12 thru 25, para 17 thru 39)**





**TASK NUMBER: 071-333-6003**

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**DRIVE A WHEELED VEHICLE USING  
BLACKOUT DRIVE**

---

**CONDITIONS:**

During darkness, given one of the vehicles listed below with operative blackout drive and a requirement to drive over varied terrain which consists of slopes, trenches, streams, etc.

1. Truck utility ¼-ton M151, A1, A2.
2. Truck cargo 1¼-ton M715.
3. Truck cargo 1¼-ton M561.

**STANDARDS:**

The individual will negotiate the natural obstacles by using blackout drive on command.

**PERFORMANCE MEASURES:**

**Blackout Night Driving** (figures 1 thru 3).

1. Hold lock lever in UNLOCK position, turn main lever to BO DRIVE position, and then release lock lever.
2. The blackout headlight, the blackout marker lights, and the blackout bulbs in each taillight will come on. The blackout stoplight will come on when the brake pedal is depressed (figures 1 and 2).

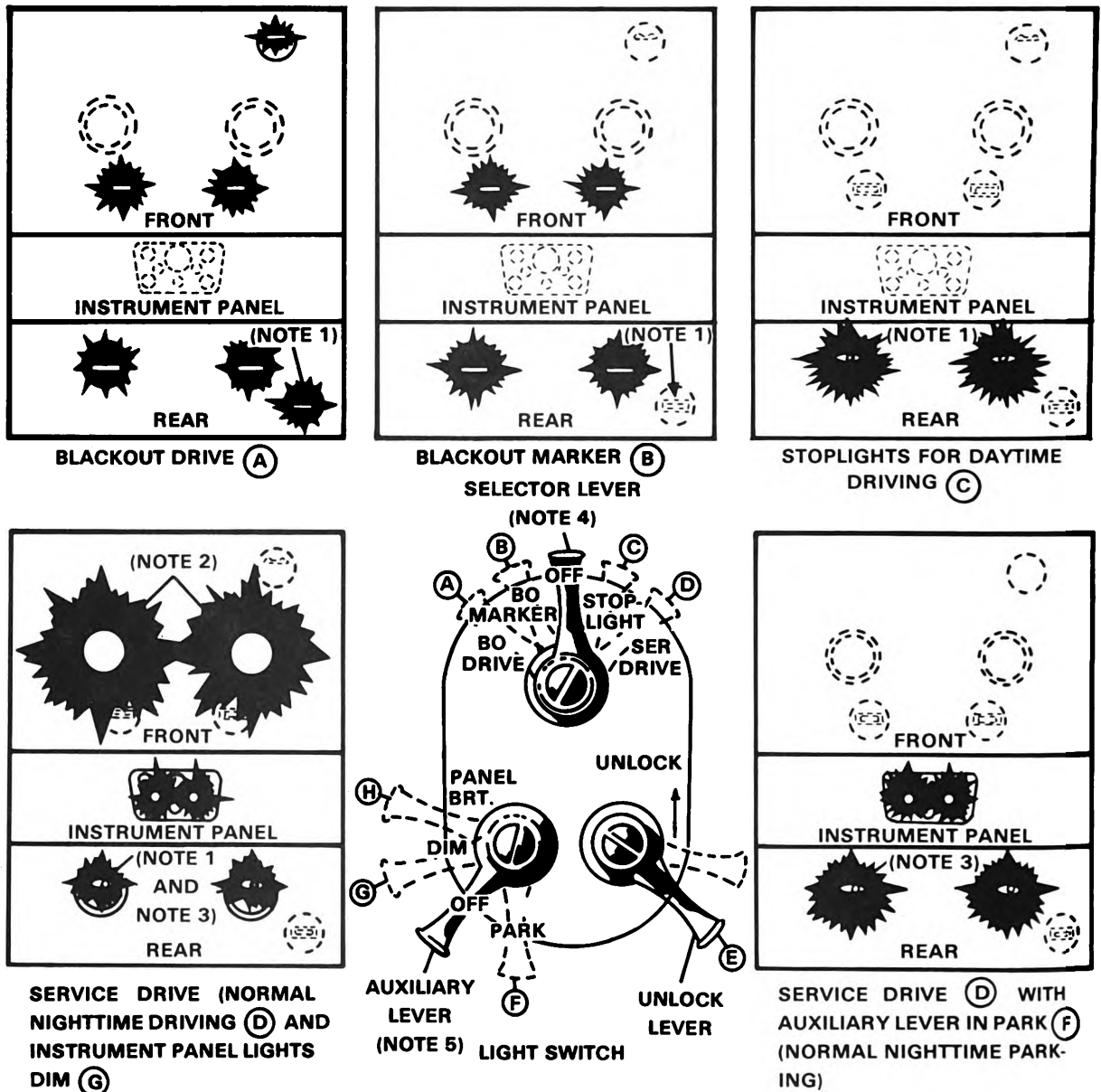


Figure 1.

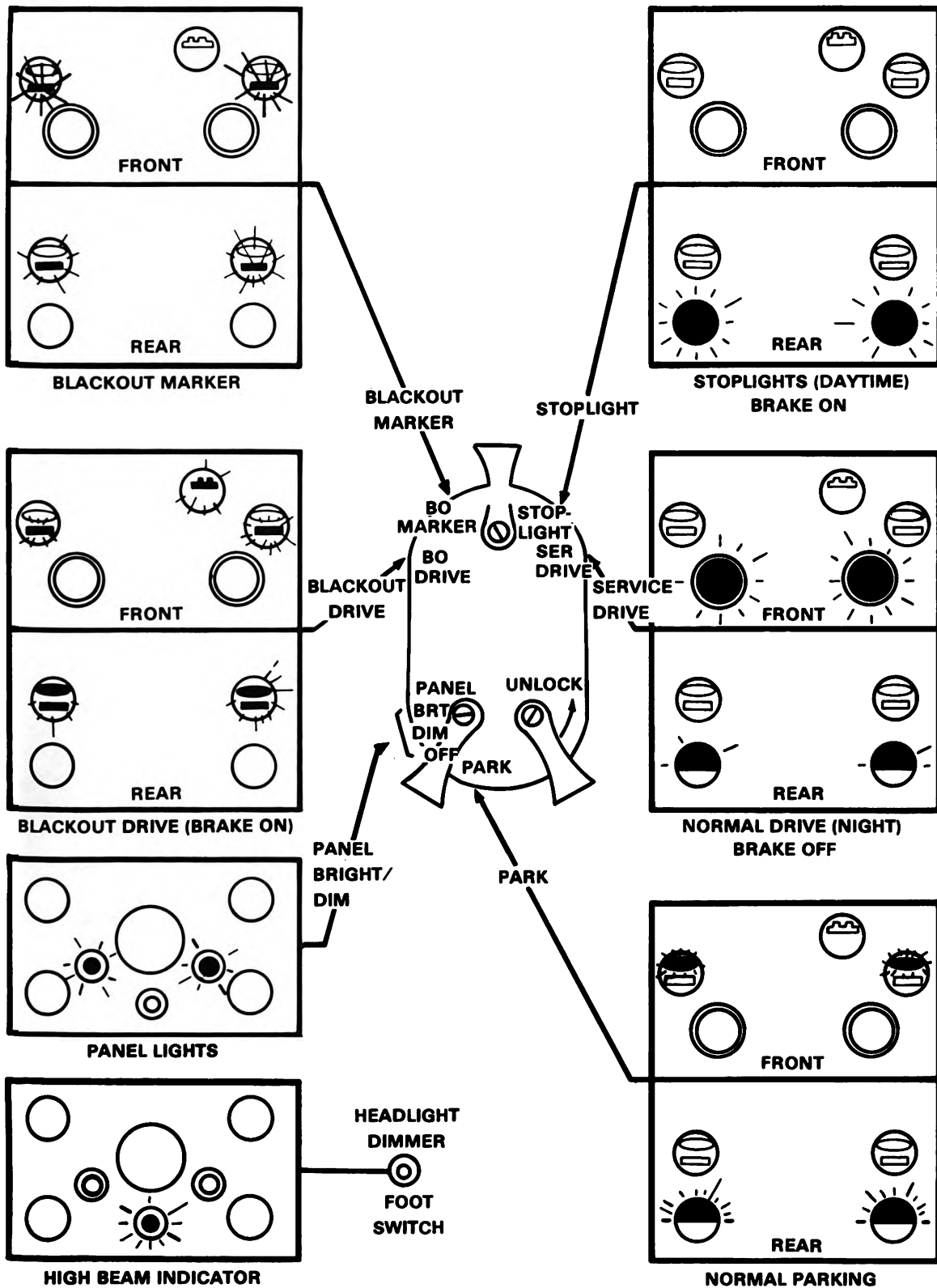


Figure 2.  
2-VI-A-3.3

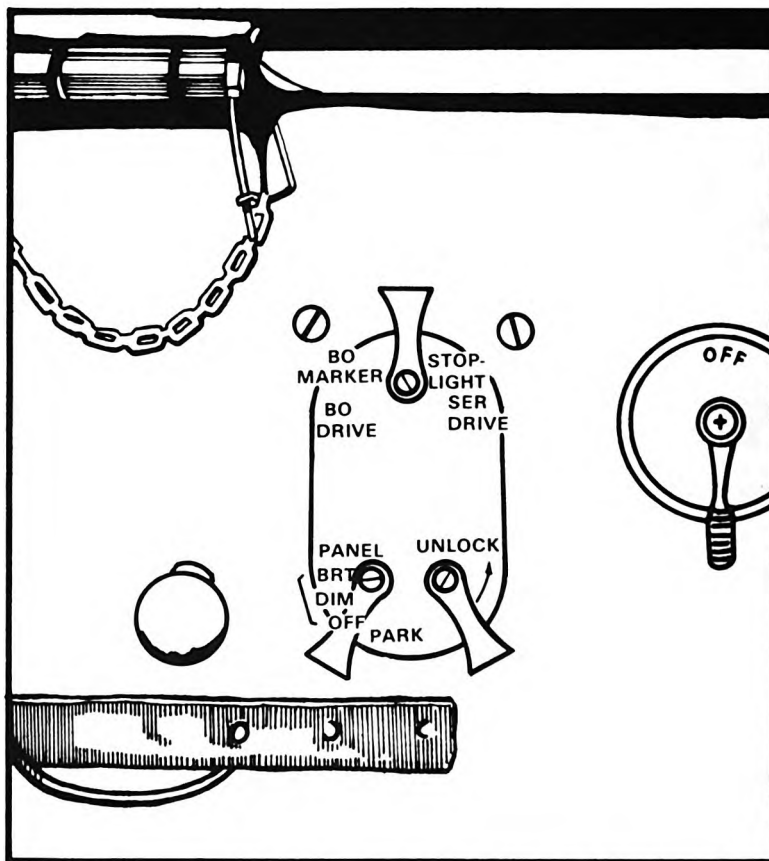


Figure 3.

**REFERENCES:**

**TM 9-2320-218-10, Operator's Manual for Truck, Utility: ¼-ton, 4X4, M151, Aug 78**

**TM 9-2320-242-10, Operator's Manual for Truck, Cargo: 1¼-ton, 6X6, M561, Mar 77 (chap 2, sec III, page 2-26 thru 2-27, para 16)**

**TM 9-2320-244-10, Operator's Manual for Truck, Cargo: 1¼-ton, 4X4, M715, C1, Aug 68 (page 12 thru 13)**

**TASK NUMBER: 071-333-6004**

---

**START A WHEELED-VEHICLE ENGINE USING  
AUXILIARY POWER (M151, M715, M561)**

---

**CONDITIONS:**

Given two wheeled vehicles (one operative and one with a dead battery) and an auxiliary power cable.

**STANDARDS:**

Start the engine of the vehicle with the dead battery, using an auxiliary power cable, without damaging either vehicle.

**PERFORMANCE MEASURES:**

1. The auxiliary power cable receptacle, located as shown in figures 1 through 3, provides for use of 24-volt power from an outside source to start the engine, charge batteries, or operate electrical equipment.

2. To start the engine:

a. Turn the ignition switch (master switch on M561) OFF before connecting auxiliary power cable.

b. Insure vehicle providing external power source is switched off.

c. Unscrew protective cap from the slave receptacle of both vehicles.

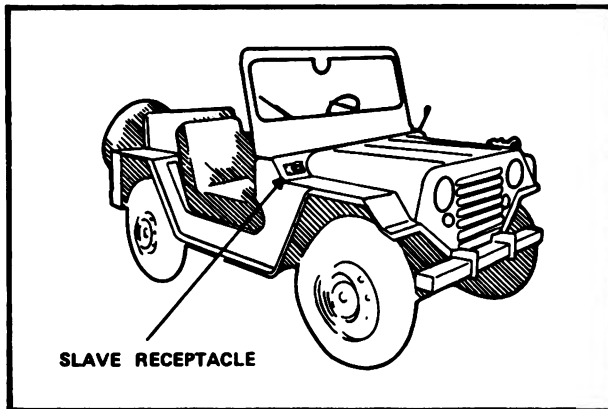
d. Connect auxiliary cable from external power source to receptacle.

**CAUTION:** Make certain prongs of auxiliary power source correspond to holes of vehicle electrical system, as marked on slave receptacle (negative (-) to negative (-), positive (+) to positive (+)).

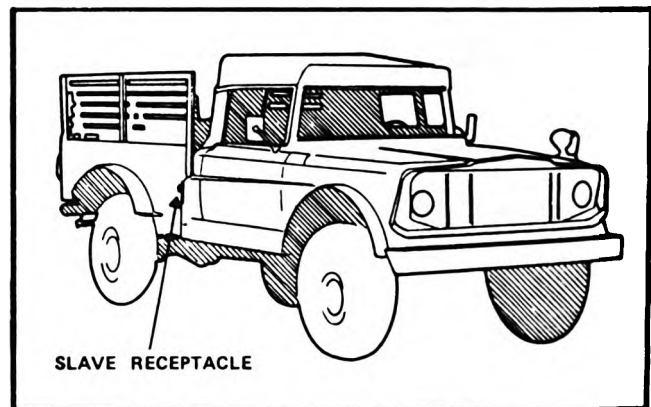
e. Turn ignition switch on both vehicles (master switch on M561) ON, and start engine in normal manner.

f. Disconnect auxiliary power cable after engine starts.

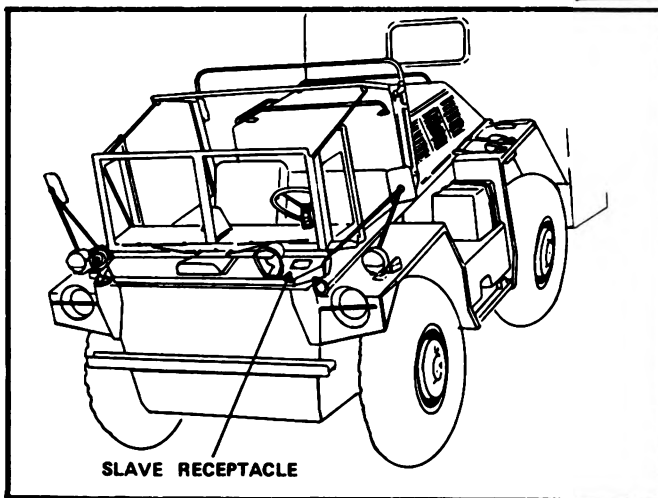
g. Install protective cap on receptacle of both vehicles.



*Figure 1.*



*Figure 2.*



*Figure 3.*

**REFERENCES:**

- TM 9-2320-218-10, Operator's Manual for Truck, Utility: ¼-ton, 4X4, M151, Aug 78
- TM 9-2320-242-10, Operator's Manual for Truck, Cargo: 1¼-ton, 6X6, M561
- TM 9-2320-244-10, Operator's Manual for Truck, Cargo: 1¼-ton, 4X4, M715, C1, Aug 68 (page 31)

**TASK NUMBER: 071-333-6007**

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**PERFORM OPERATOR MAINTENANCE ON A  
WHEELED VEHICLE**

---

**CONDITIONS:**

Given one of the vehicles listed below, basic issue items, an operator's TM for the vehicle, a lubrication order for the vehicle, the equipment record folder, TM 38-750, and a DA Form 2404.

1. Truck, utility, ¼-ton, M151A1, A2.
2. Truck, cargo, 1¼-ton, M715.
3. Truck, cargo, 1¼-ton, M561.
4. Truck, platform, utility, ½-ton, M274A2, A3, A4, A5.

**STANDARDS:**

The individual will:

1. Perform before-, during-, and after-operation maintenance on the vehicle IAW instructions in the -10 TM.
2. Identify maintenance deficiencies/shortcomings and correct those within the operator's capability.
3. Cross-reference uncorrectable faults against the DA Form 2408-14.
4. Prepare a DA Form 2404 to notify organizational maintenance of previously unreported uncorrectable faults or repairs which require a part.
5. Lubricate the vehicle IAW the lubrication order.
6. Perform troubleshooting procedures on the vehicle IAW the appropriate TM.

**PERFORMANCE MEASURES:**

1. Operator maintenance follows procedures outlined in the preventive maintenance services section of the appropriate TM.
2. To correct deficiencies/shortcomings, refer to the appropriate TM.
3. Previously reported faults beyond the operator's capability to repair or those requiring parts are recorded on the Uncorrected Fault Record (DA Form 2408-14) in the vehicle logbook. This form is completed by organizational maintenance IAW procedures outlined in paragraph 4-13 or TM 38-750.

4. Faults which the operator cannot correct or which require a part are recorded on DA Form 2404 IAW procedures outlined in paragraph 3-4 of TM 38-750.
5. The vehicle is lubricated IAW the instructions in the lubrication order.
6. Troubleshooting procedures are outlined in the troubleshooting section of the appropriate TM.

**REFERENCES:**

**TM 9-2320-218-10, Operator's Manual for Truck, Utility: ¼-ton, 4X4, M151**  
**TM 9-2320-242-10, Operator's Manual for Truck, Cargo: 1¼-ton, 6X6, M561**  
**TM 9-2320-244-10, Operator's Manual for Truck, Cargo: 1¼-ton, 4X4, M715, C1, Aug 68 (pages 35, 36, 55 thru 59)**  
**TM 9-2320-246-10, Truck, Platform, Utility, ½-ton, M274A1, M274A2, M274A3, M274A4, and M274A5, Apr 67 (pages 3-7 thru 3-16)**  
**TM 38-750, The Army Maintenance Management System, C2, May 78 (chap 3, page 3-7, para 3-4)**  
**LO 9-2320-244-12, Truck Cargo 1¼-ton, 4X4, M715, Aug 73**



**TASK NUMBER: 071-333-6008**

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**RECOVER A WHEELED VEHICLE**

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**CONDITIONS:**

During combat or training under all type weather conditions, given a wheeled vehicle requiring recovery (the vehicle is equipped with basic issue items), either applicable materials for expedient recovery or a similar vehicle, and one or more assistant drivers.

**STANDARDS:**

Recover the disabled wheeled vehicle using one of the following:

1. Similar vehicles if available for recovery.
2. Vehicle's basic issue items for self-recovery.
3. One of the following expedient methods:
  - a. Prying.
  - b. Use disabled vehicle wheels for winching.
  - c. Use an A-frame.

**PERFORMANCE MEASURES:**

1. **Methods of Recovery.** There are four methods of recovery that are performed using organizational personnel and equipment.

a. **Winching.** Operations performed using winches on special purpose vehicles or cargo type vehicles.

b. **Towing.** Operations performed using towing capabilities of similar or special purpose vehicles. This is the quickest recovery method.

c. **Lifting.** Operations performed using special purpose vehicles.

d. **Expedients.** Used when other methods are not adaptable to the situation or when additional vehicles and equipment are not readily available.

2. **Levels of Recovery.** Recovery operations performed within an organization are divided into levels based on personnel who perform the operations and equipment available to them.

a. **Platoon Level.** Recovery performed by vehicle drivers and crews, under supervision of squad, section, or platoon leader. At this level, winching, towing, and expedient methods of recovery are employed, using platoon vehicles and equipment.

b. **Company and Battalion Levels.** Recovery performed by general vehicle repairmen or recovery specialists under the supervision of the recovery chief, using winching, towing, and lifting methods of recovery with special purpose vehicles. Because of the increased number of special purpose vehicles at battalion level, a greater recovery capability exists than at company level.

3. **Recovery Procedure.** During any recovery operation, a proven procedure should be used to insure quick and safe accomplishment. A haphazard approach to a recovery problem or the trial and error method can only result in a prolonged immobility of the disabled vehicle, loss of valuable time, damage to equipment, and possible injury to personnel. The following eight-step recovery procedure, in the proper sequence, should be used in any recovery involving winching.

## RECOVERY PROCEDURE

### RECONNOITER AREA

### ESTIMATE SITUATION

### CALCULATE RATIO

### OBTAIN RESISTANCE

### VERIFY SOLUTION

### ERECT RIGGING

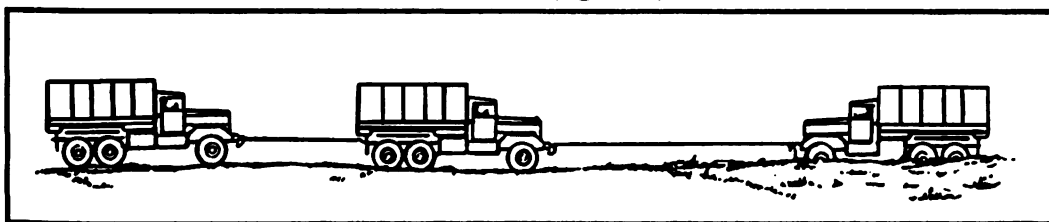
### RECHECK RIGGING

### YOU ARE READY

4. **Vehicle Recovery Operations (Similar Vehicles).** The amount and type equipment employed as the source of effort during any recovery operation is dependent upon the level of recovery as discussed in paragraph 2. Every effort should be made by the drivers and crews to accomplish the recovery before calling on support from a higher level. During combat, it may be of the utmost importance that cargo reach its destination at a definite time, or that personnel or cargo be picked up at a given time, or that a combat vehicle be at a given place at a specific time. The use of similar vehicles for recovery usually constitutes the **QUICKEST METHOD** of recovery because similar vehicles are readily available. Recovery support should be called upon only when the similar vehicles are not adaptable to the situation or when the tactical situation does not permit their use. Engaged combat vehicles should never be diverted for the purpose of recovery.

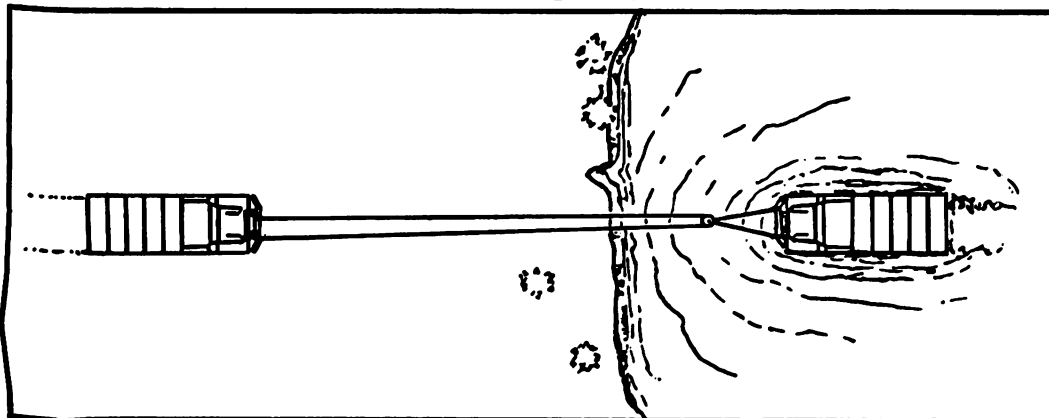
**5. Use of Similar-Type Wheeled Vehicles for Recovery.** Similar wheeled vehicles can be used as the source of effort to perform recovery by towing and winching.

a. To recover a mired truck by towing with a similar vehicle, a tow chain should be used between the towing and the mired vehicle, attached to one of the lifting shackles of the mired vehicle and a front lifting shackle on the towing vehicle. If a greater working distance is required to enable the towing vehicle to get better traction, then the tow chains from both vehicles should be used. Power must be applied slowly to prevent placing an impact on the chain and lifting shackles. A chain, unlike a cable, will not stretch and can easily be broken by impact. If one towing vehicle cannot attain sufficient towing effort to overcome the resistance, another towing vehicle can be used in tandem with the first (figure 1).



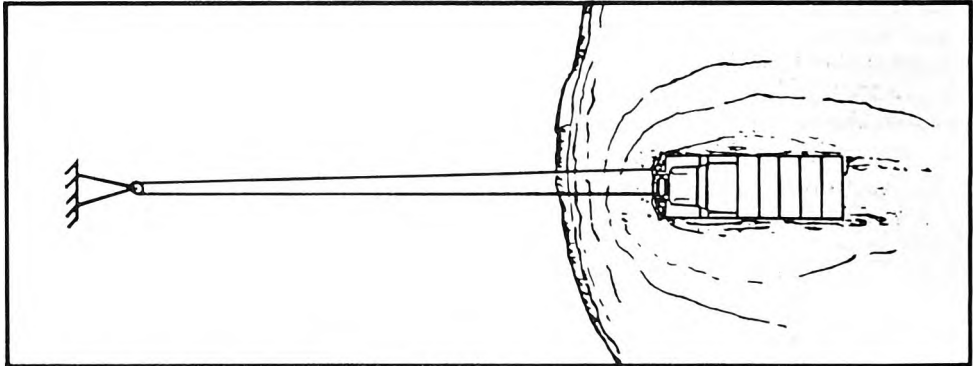
*Figure 1. Towing a cargo truck from mire.*

b. To recover a mired cargo truck by winching, a truck of equal or greater capacity should be used to perform the winching operation. As an example, a mired  $1\frac{1}{4}$ -ton cargo truck may be winched with either a  $1\frac{1}{4}$ -ton or  $2\frac{1}{2}$ -ton vehicle. All winch-equipped trucks are authorized a single sheave snatch block and one tow chain for rigging. A mechanical advantage is required if the resistance of the mired truck is greater than the winch capacity. The winching vehicle must be positioned in line with the mired vehicle so the correct fleet angle is obtained. The winch cable must be free-spooled from the drum and the free end of the cable attached to one of the winching vehicle's front lifting shackles or to a separate anchor. A chain sling is formed between the lifting shackles of the mired vehicle and the snatch block is attached in the apex of the sling. The loop formed in the winch cable is placed in the snatch block and power is applied to the winch to remove the slack from the cable (figure 2).



*Figure 2. Winching with a similar vehicle.*

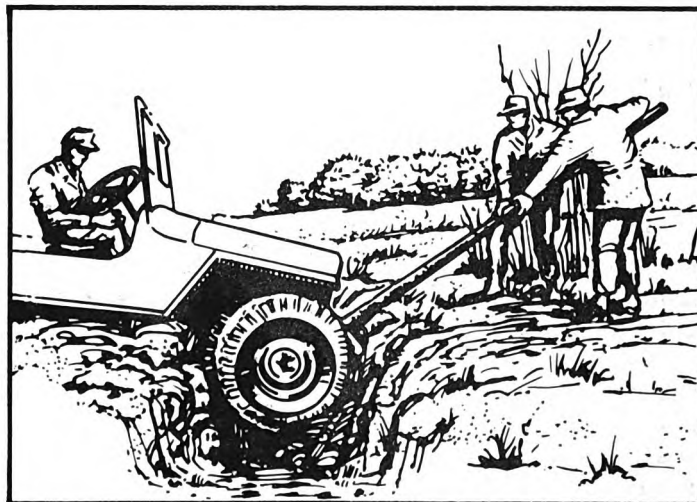
c. A winch-equipped mired vehicle can perform a self-recovery. The rigging is similar to that used for similar vehicle recovery except the snatch block is attached to a suitable anchor and the free end of the cable attached to one of the mired vehicle's front lifting shackles. A fixed block will gain a mechanical advantage on a self-winch operation even though the sheave of the block is performing as a first-class lever because the source of effort (the winch) is part of the load; therefore, both the fall line and return line are attached to the load and supporting it. Since there are two lines supporting the load, a 2 to 1 mechanical advantage is obtained (figure 3).



*Figure 3. Self-winch operation.*

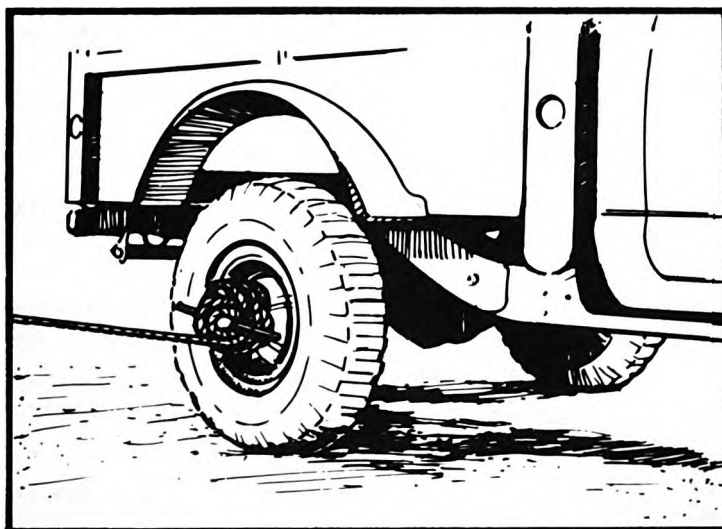
**6. Recovery Expedients.** Military operations will require vehicles to operate in remote areas where, should disablement occur, assistance would not be readily available. Under these conditions, the driver or crew must attempt self-recovery by the use of expedients. An expedient is an improvised method and is accomplished with the materials on hand.

a. **Use of a Pry.** A pole can be used to pry a ¼-ton truck out of a ditch by lifting the front end of the truck with the pole as illustrated in figure 4, and applying power to the truck in reverse gear.



*Figure 4. Pole used as a pry.*

b. **Use of Wheels for Winching.** On wheeled vehicles not equipped with a winch, the rear wheels may be used to assist in recovering the vehicle. On a dual-wheeled truck, a rope with one end fastened to the wheel hub and the other end anchored, will cause the rope to be wound between the dual wheels providing the same action as a winch. The end of the rope that is fastened to the wheels should be run between the duals and through one of the holes in the wheel disk. Care should be taken not to place the rope through a hole in the wheel disk where the valve stem is located. A bowline knot is tied in the end of the rope and slipped over the hub. Tie a second rope in the same manner to the dual wheels on the other end of the axle, then place the vehicle in reverse gear; the ropes will wind between the two duals, causing the vehicle to move rearward. If the truck has single wheels, such as the M715 and M151, the same expedient can be used by placing a bar through the hole in the end of the axle flange. A rope is attached to the wheels on each side of the vehicle by fastening them to the bars with figure 8 hitches (figure 5). Applying power will cause the ropes to be wound around the hubs and move the vehicle.



*Figure 5. Attachment of rope to single wheels to be used as a winch.*

c. **Use of an A-Frame.** Frequently, a truck will become nosed in a shell hole or narrow ditch. When a truck becomes disabled in this manner, both lifting and pulling forces are required to make the recovery. The lifting force can be obtained from an A-frame. To construct an A-frame, two poles approximately 8 feet long and large enough in diameter to support the front end of the truck will be needed. The poles should be lashed together at the top by a figure 8 or girth hitch (figure 6). The lower end of the poles should be placed in the ground 10 to 12 inches deep to prevent them from sliding when power is applied. The upper end of the A-frame is laid across the hood of the vehicle and the attachment made as in figure 7. If the nose truck is equipped with a winch, the winch cable should be rigged for a 2 to 1 mechanical advantage, with the end of the cable secured to the apex of the A-frame.

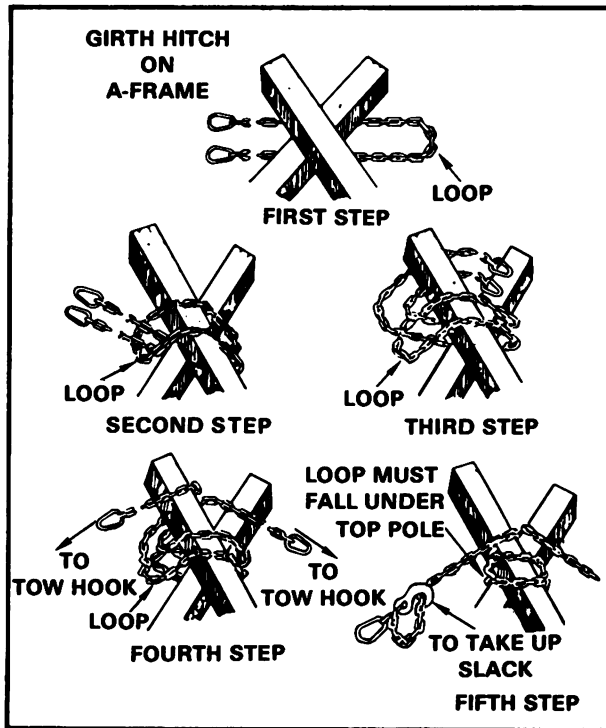


Figure 6. Tying girth hitch to A-frame.

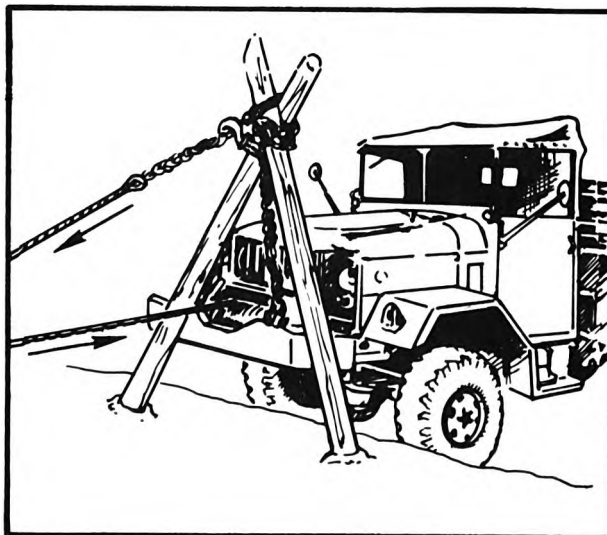


Figure 7. Recovery of a nosed truck using an A-frame.

## REFERENCES:

FM 5-34, Engineer Field Data, Sep 76 (chap 16, page 367 thru 369, para 16-7)  
 FM 20-22, Vehicle Recovery, Jul 70 (chaps 5 and 6, pages 58 thru 108)

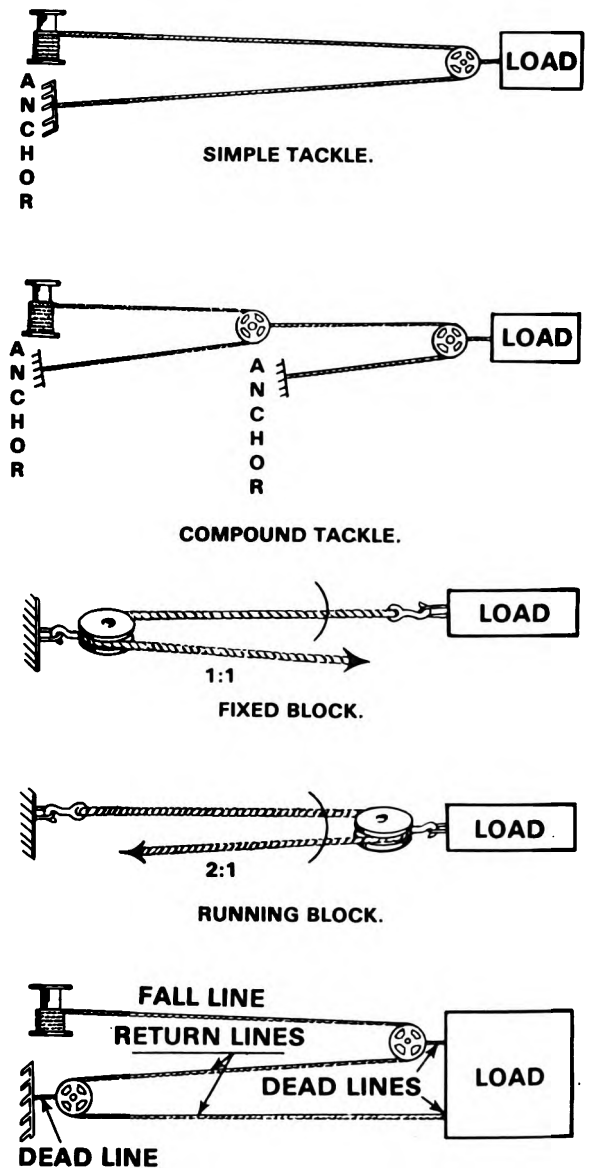


Table 1. Tackle terminology.

**TASK NUMBER: 071-333-6508**

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**PERFORM OPERATOR MAINTENANCE  
ON A TRACKED VEHICLE**

---

**CONDITIONS:**

Given an M113A1 APC or M901 improved TOW vehicle, basic issue items, TM 9-2300-257-10 or TM 9-2350-259-10, LO 9-2300-257-12, DA Form 2404, and DA Form 2408-14.

**STANDARDS:**

1. Perform before-, during-, and after-operation preventive maintenance checks and services on the vehicle IAW instructions in TM 9-2300-257-10/TM 9-2350-259-10.
2. Identify maintenance deficiencies or shortcomings and correct those within your capability as operator.
3. Prepare a DA Form 2404, Equipment Inspection and Maintenance Worksheet, to notify organizational maintenance of previously unreported correctable faults or repairs which require a part.
4. Lubricate the vehicle IAW LO 9-2300-257-12.
5. Perform troubleshooting procedures on the vehicle IAW TM 9-2300-257-10/TM 9-2350-259-10.

**PERFORMANCE MEASURES:**

1. Operator maintenance follows procedures outlined in the preventive maintenance checks and services section of TM 9-2300-257-10 (chap 2, sec II)/TM 9-2350-259-10.
2. To correct deficiencies or shortcomings, refer to TM 9-2300-257-10/TM 9-2350-259-10.
3. Previously reported faults beyond the operator's capability to repair or those requiring parts are recorded on the DA Form 2408-14 in the vehicle logbook. This form is completed by organizational maintenance IAW procedures outlined in paragraph 4-13 of TM 38-750.
4. Faults which the operator cannot correct or which require a part are recorded on DA Form 2404 IAW procedures outlined in paragraph 3-4 of TM 38-750.
5. The vehicle is lubricated IAW LO 9-2300-257-12.

6. Troubleshooting procedures are outlined in TM 9-2300-257-10 (chap 3, sec III)/TM 9-2350-259-10.

**REFERENCES:**

**TM 38-750, The Army Maintenance Management System (TAMMS), May 78 (chap 3, pages 3-7 thru 3-12, para 3-4)**

**TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (chap 2, pages 2-20 thru 2-60); chap 3, sec III, pages 3-2 thru 3-13)**

**TM 9-2350-259-10, Operator's Manual: Combat Vehicle, Antitank, Improved TOW Vehicle, M901**

**LO 9-2300-257-12, Lubrication Order (M113A1), Oct 73**

**TEC Lesson 945-171-0051-F, Before-operations Maintenance M113A1/M577A1, Part 1.**

**TEC Lesson 945-171-0052-F, Before-operation Maintenance M113A1/M577A1, Part 2.**

**TEC Lesson 945-171-0053-F, During operations Maintenance M113A1/M577A1**

**TEC Lesson 945-171-0054-F, After operations Maintenance M113A1/M577A1**



**TASK NUMBER: 071-333-6502**

---

**DRIVE A TRACKED VEHICLE ON ROADS, IN  
VEHICLE PARKS, AND IN BUILT-UP AREAS**

---

**CONDITIONS:**

Given an M113A1 or M901 improved TOW vehicle to drive on roads, in vehicle parks, and in built-up areas.

**STANDARDS:**

Operate the vehicle IAW local traffic regulations, the rules of the road, and safety factors outlined in the unit SOP, TM 21-301, TM 21-306, AR 385-10, and AR 385-55.

**PERFORMANCE MEASURES:**

1. The unit SOP will provide information on vehicle operation, to include references to appropriate local regulations. Additional background and Army-wide operating procedures, as well as the most important international traffic signs, are given in references cited below.
2. Traffic controls such as signs, signals, devices, and markings are explained in TM 21-301, chapter 10.
3. The rules of the road are explained in TM 21-301, chapters 6, 7, 8, 9, and 11.
4. Safety is discussed in TM 21-306, section II, paragraph 12. Additional safety requirements are outlined in AR 385-10 and AR 385-55.

**REFERENCES:**

AR 385-10, The Army Safety Program  
AR 385-55, Prevention of Motor Vehicle Accidents, Apr 74 (chap 2, page 2-1, para 2-1)  
TM 21-301, Driver Selection, Training, and Supervision, Tracked Vehicles, Jul 67 (chap 3, page 6, para 11; chap 4, page 12-25, para 17 thru 39)  
TM 21-306, Manual for the Tracked Combat Vehicle Driver, Aug 64, C1 (chap 2, sec I thru V, page 3-49, para 6-31)



**TASK NUMBER: 071-333-6500**

---

**DRIVE A TRACKED VEHICLE  
(M113A1 or M901)**

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**CONDITIONS:**

Given an M113A1 personnel carrier during all weather conditions, a track commander, and a requirement to drive the M113A1 from one point to another.

**STANDARDS:**

1. Drive the M113A1 IAW the performance measures.
2. Bypass all obstacles where possible. When they cannot be bypassed, inform track commander and follow his instructions.

**PERFORMANCE MEASURES:**

**WARNING:**

Carrier will not be started unless the portable and fixed fire extinguishers are present and in operating condition.

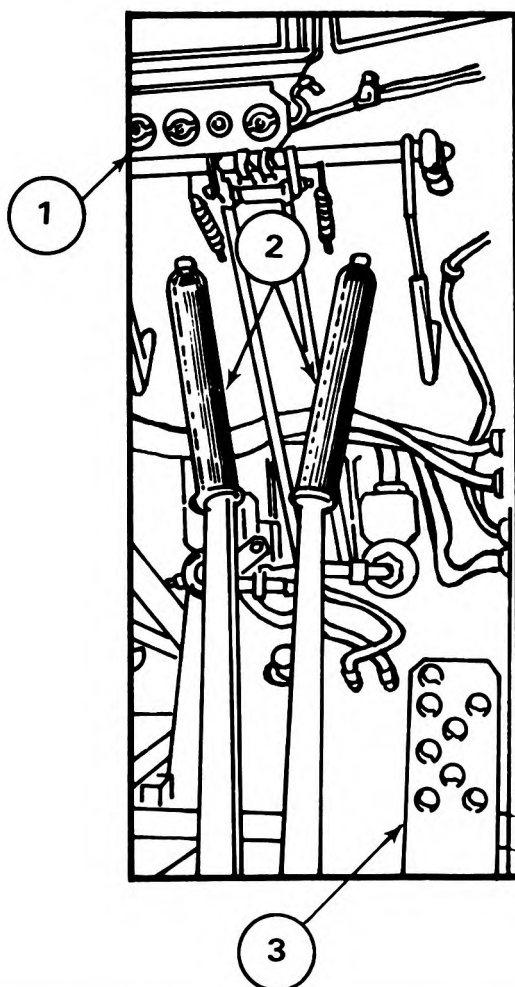
**1. Driving the carrier**

- a. Make sure the cargo, driver, and commander's hatches are locked in the open or closed position (with the positive safety pin).
- b. Start the engine.
- c. Make sure the ramp is up and securely locked (see TM 9-2300-257-10, page 2-72).
- d. Set the shift lever to the driving range you want (see paragraph 2).

e. If the tactical situation permits sound the horn ① to warn personnel that you are about to move the carrier.

f. Pull back on the steering levers ② so the lock buttons pop up, then let go forward.

g. Step on the accelerator pedal ③. Go easy. Take off nice and smooth. Push on the pedal to control the speed. The transmission will shift automatically within the range you set for it. To hold in a range past the normal shift point for a few seconds, or to shift down for extra power, push the pedal all the way to the floor.



**CAUTION:** The full-throttle transmission detent (pedal to the floor) is not a tradeoff for selecting the proper range. Use the detent for short bursts of power, not as a way to gear down for heavy hauling.

## 2. Selecting the driving range

### R RANGE

Use for backing up under all conditions.

### N RANGE

Use for starting, idling, and operating the auxiliary equipment.

### 2-3 RANGE

Use for high-speed driving on roads or level terrain when the carrier is lightly loaded.

### 1-3 RANGE

Use for normal driving on roads and level or rolling terrain. **NO DOWNSHIFT TO THIS RANGE ABOVE 40 MPH.**

### 1-2 RANGE

Use for rough or soft terrain, going up or down long or moderately steep grades, and driving in the water. **NO DOWNSHIFT TO THIS RANGE ABOVE 21 MPH.**

### 1 RANGE

Use for going up or down steep grades, and entering or leaving the water. **NO DOWNSHIFT TO THIS RANGE ABOVE 10 MPH.**

R

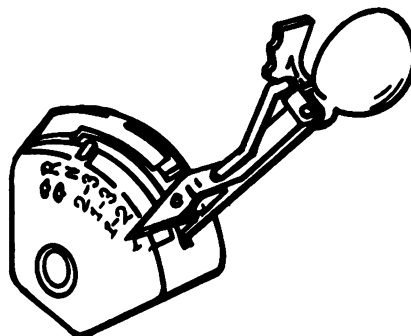
N

2-3

1-3

1-2

1



### CAUTION

Before shifting to the R (reverse) range, stop the carrier and let the engine return to 650-700 rpm.

### NOTE:

Move the shift lever sideways against its spring to guide it through the shift gates. Be sure to lift the lever over the gate stop when you shift from 1-2 to 1 range.

### CAUTION

Don't downshift at speeds faster than shown on this page.

### 3. Steering and braking



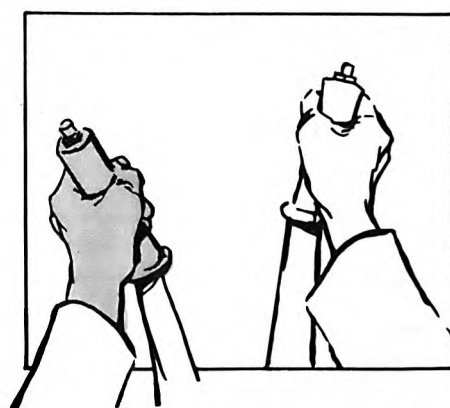
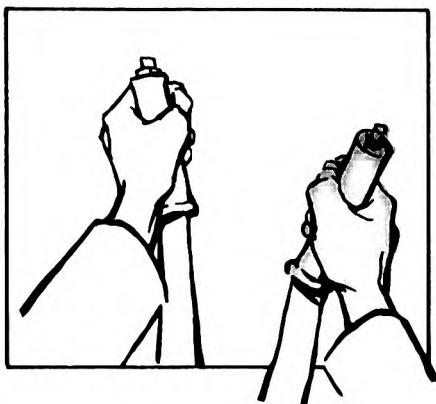
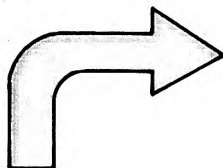
**WARNING**

Don't press or touch the lock buttons while the carrier is moving. The lock buttons are strictly hands-off except for parking.

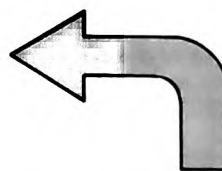
a. The steering and braking levers control separate right and left steering brakes in the control differential. By pulling on the levers, you can slow or stop either track for steering, or both tracks at once for stopping. A lock button at the top of each lever lets you set and lock the brakes for parking.

b. Going forward or backward, the carrier will always turn toward the track that's moving slower, so --

(2) Pull back on the right-hand steering and braking lever to turn RIGHT.



(1) Pull back on the left-hand steering and braking lever to turn LEFT.

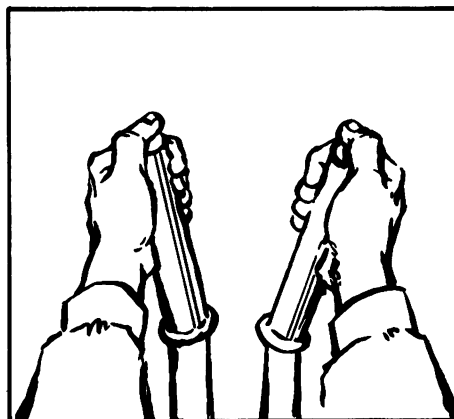
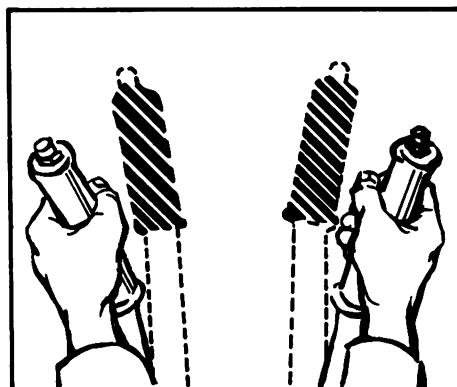


c. The harder you pull, the quicker you turn, so use your head as well as your hand. Just like the brakes in a car, the steering brakes can fade if they get too hot. They can get glazed and lose their grip from too much light use. You need them, so take care of them. Don't just haul back and wait until the carrier is pointed where you want it to go. Pump the levers smoothly, so the brakes work, on and off. The faster you go, the wider the turn, so look and think ahead. Plan where you want the carrier to go, and be sure you have room to move.

d. To stop, pull both levers at once. The same methods that apply to steering apply to stopping. Unless it's an emergency, don't just haul back and hope. Use a pumping movement. Balance the pull so the carrier stops in a straight line, unless you really mean to stop and turn at the same time. Get your foot off the accelerator pedal when you're stopping. In fact, you'll often find that you can coast to a stop without using the brakes at all.

e. To lock the brakes for parking, pull back hard on both levers and press the lock buttons down.

f. To unlock the brakes, pull back on the levers without touching the lock buttons. The buttons will pop up and release the levers.

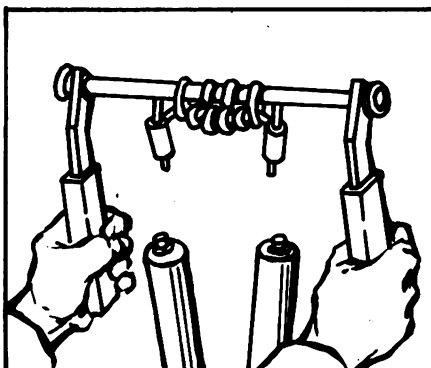


#### 4. Pivot steering and braking

##### CAUTION

Unless it's an emergency, **NEVER** use the pivot steer brakes when you're going faster than 15 mph, or in a driving range higher than 1-2. Never use the pivot steer brakes and differential brakes at the same time — that's a sure way to mess up the differential.

a. The pivot steer brakes work like the differential brakes, only more so. They're disk brakes, and when you pull the handle, they lock up right then.



- b. Pull the right handle to pivot **RIGHT**.
- c. Pull the left handle to pivot **LEFT**.
- d. Pull both handles to make a sudden stop from a slow speed. You can use the pivot brakes if the differential brakes fail, but, if you're moving very fast, something could break.

**5. Driving an M113A1 under adverse conditions**

a. To drive an M113A1 during periods of extreme heat, humidity, or salty conditions, the following rules also apply:

- (1) Check the gages and warning light often while driving.
- (2) Stop and fix any problem as soon as it occurs or as soon as the tactical situation will allow.
- (3) Check the radiator, air cleaner, and battery often.
- (4) When at a halt, keep the vehicle in shelter or shade as much as possible.
- (5) If shelter is unavailable, cover the vehicle with a tarpaulin, or at least cover the air intake and exhaust grills.
- (6) Keep the vehicle clean to prevent the growth of fungus.
- (7) Lubricate frequently.
- (8) Do not drive in a lower gear than necessary.
- (9) Keep the radiator clear of dirt, bugs, and build-up.

b. To drive an M113A1 during periods of snow and rain, the following rules also apply:

- (1) Use a low transmission range to move the vehicle without digging in.
- (2) Clean mud or snow off the tracks and roadwheels as soon as possible after operation.
- (3) If the vehicle breaks through heavy snow crust, use the 1 range to climb back onto the crust.
- (4) Use the transmission range that gives the best traction when you must drive in soft or fine snow.
- (5) Use a transmission range that moves the vehicle steadily and without straining the engine when driving on ice. Drive carefully to avoid skidding.
- (6) Before operating in heavy mud, deep sand or snow, or heavy underbrush, take off the track shroud.



(7) If freezing temperatures are expected, do not park the vehicle where it could become frozen to the ground. If possible, use brush, boards, or any similar material to hold the track up off the ground.

(8) When driving through heavy mud, sand, or underbrush, turn vehicle by making a series of short turns.

(9) If driving on a snow- or ice-covered grade, go as nearly straight up/down the slope as possible.

## **6. Driving precautions**

a. Use the 1-2 range until you get used to driving the carrier.

b. Take care not to oversteer or go too fast, especially on hard pavement. You could lose control of the carrier.

c. Slow way down when you get to the top of a hill or the edge of a trench or ditch.

d. Use a low range (1 or 1-2) when driving down steep hills, and keep your speed down. When going down a trench or ditch, take care not to let the final drives dig in at the bottom.

e. Just as you get to the bottom of a trench or ditch, gun the engine. This helps lift the final drives away from the bottom.

f. On loose sand, dirt, or rock, especially on side slopes, steer in several short turns to let the track clear itself of rocks, dirt, branches, and other junk. In heavy sand, mud, snow, or heavy growth, remove and stow the track shrouds.

g. Don't use the engine and transmission to hold the carrier on a slope. If the engine is running, the transmission will overheat; if the engine is off, it won't hold. Use the brakes.

h. Except in an emergency, don't use the hand throttle for driving.

i. Before lowering or raising ramp, check the rear area for clearance and sound the horn twice. Defective ramps will be marked "Free Fall Ramp" on the ramp and sides of the vehicle.

j. Allow no one to ride on top of the carrier.

k. Protective headgear, track commander's (TC) helmet (CVC), or helmet liner will be worn by all personnel.

l. Driver and TC will wear protective eye gear.

## **REFERENCES:**

**TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (chap 2, pages 2-66 thru 2-71)**

**TEC Lesson 945-171-0100-F, Varied Terrain Driving**

**TEC Lesson 945-171-0101-F, Reduced Traction and Hazards**



TASK NUMBER: 071-333-6512

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**NEGOTIATE OBSTACLES IN A TRACKED VEHICLE**  
**(M113A1 or M901)**

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**CONDITIONS:**

Given an M113A1 personnel carrier, a track commander, and a requirement to drive across various obstacles.

**STANDARDS:**

1. Drive the vehicle IAW the performance measures —
  - a. Over a trench 1.67 meters (5½ feet) wide.
  - b. Over a .7-meter (2-feet) high vertical wall.
  - c. Up a 60% grade.
2. Approach all obstacles at a speed no greater than 5 mph.
3. Approach all obstacles straight on.

**PERFORMANCE MEASURES:**

1. Follow all instructions given by the vehicle commander.
2. To cross a trench or ditch 1.67 meters (5½ feet) wide or less:
  - a. Ease up to the ditch.
  - b. Place the gear selector into the 1 range.
  - c. Enter the ditch slowly.
  - d. Keep up enough power to carry the vehicle to the far bank.
  - e. Accelerate to climb out.
  - f. Release the accelerator or the vehicle will pitch forward.
  - g. Move out normally.
3. To climb a vertical wall .7 meter (2 feet) high (or less):
  - a. Ease up to the wall.
  - b. Place the gear selector into the 1 range.
  - c. Accelerate to climb the wall.

- d. Accelerate until the vehicle starts a downward motion.
  - e. Allow vehicle to lower itself until the tracks touch the ground.
  - f. Accelerate vehicle and move out.
4. To climb a grade of 60% (or less):
- a. Place transmission in desired range (refer to task: **Drive A Tracked Vehicle (M113A1 or M901)**).
  - b. Pick the straightest route possible.
  - c. Do not steer anymore than necessary.

**REFERENCES:**

**TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored; M113A1, Aug 78 (chap 2, pages 2-66 and 2-67)**  
**TM 21-306, Manual for the Tracked Combat Vehicle Driver, Aug 64, C1 (sec IV, page 26, para 23b and c)**  
**TEC Lesson 945-171-0100-F, Varied Terrain Driving**  
**TEC Lesson 945-171-0101-F, Reduced Traction and Hazards**

**TASK NUMBER: 071-333-6505**

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**START A TRACKED VEHICLE ENGINE  
USING AUXILIARY POWER**

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**CONDITIONS:**

Given two M113A1 armored personnel carriers (one operative and one with a dead battery) or two M901 improved TOW vehicles (one operative and one with a dead battery), and an auxiliary power cable.

**STANDARDS:**

Start the engine of the inoperative vehicle using an auxiliary power cable, without damaging either vehicle.

**PERFORMANCE MEASURES:**

1. The auxiliary power cable receptacle on the master switch panel provides for use of 24-volt power from an outside source to start the engine, charge batteries, or operate electrical equipment.
2. To start the engine:

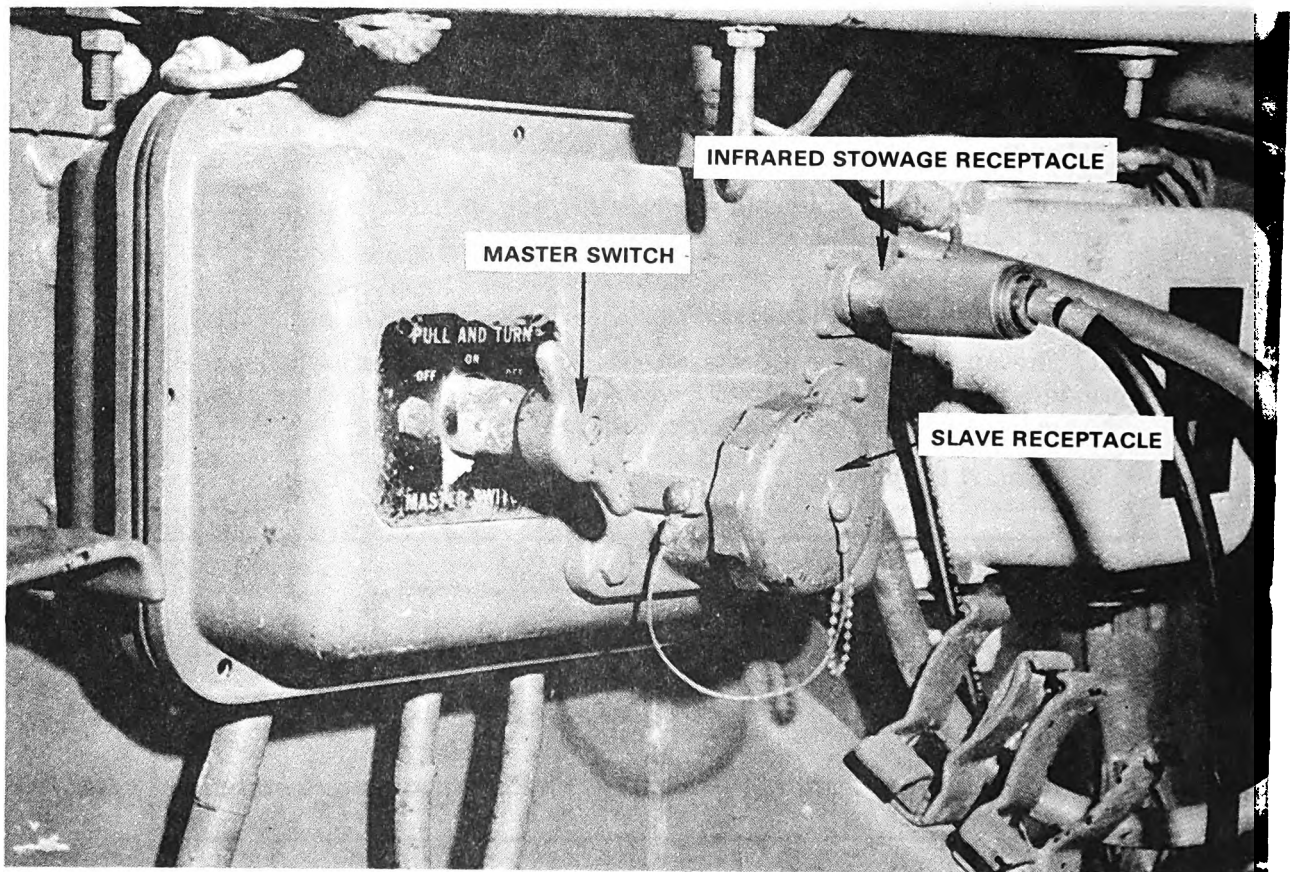
**WARNING**

**Do not allow personnel between vehicles during slave starting.**

- a. Position the source vehicle next to the carrier so that the slave cable can connect the auxiliary power receptacles on both vehicles.
- b. Turn master switch OFF on both vehicles before connecting auxiliary power cable (figure 1).
- c. Unscrew protective cap from slave receptacle on master switch panel.
- d. Connect slave cable to receptacle on the disabled carrier, then to the auxiliary power receptacle on the source vehicle.

**CAUTION:** Make certain prongs of auxiliary power source correspond to holes of carrier electrical system, as marked on slave receptacle, (negative (-) to negative (-), positive ( + ) to positive ( + ).

- e. Turn master switch ON on the dead vehicle and start engine in normal manner. Make sure the engine of the source vehicle is running.
- f. Disconnect auxiliary power cable after engine starts.
- g. Install protective cap on receptable.



*Figure 1.*

**REFERENCES:**

TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (chap 2, page 2-75)  
TM 9-2350-259-10, Operator's Manual: Combat Vehicle Antitank Improved TOW Vehicle, M901

**TASK NUMBER: 071-333-6503**

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**DRIVE A TRACKED VEHICLE WITH NIGHT VISION  
DEVICES, INFRARED EQUIPMENT,  
AND BLACKOUT DRIVE**

---

**CONDITIONS:**

During darkness, given an M113A1 or M901 improved TOW vehicle with operative blackout drive and an M19 infrared periscope, a vehicle commander, and a requirement to drive over varied terrain which consists of slopes, trenches, vertical walls, streams, etc.

**STANDARDS:**

Negotiate the obstacles by:

1. Using blackout drive on command.
2. Installing and using M19 infrared periscope on command.

**PERFORMANCE MEASURES:**

1. **Blackout Night Driving** (figure 1).
  - a. Hold lock lever in UNLOCK position, turn main lever to B.O. DRIVE position, and then release lock lever.
  - b. The blackout headlight, the blackout marker lights, and the blackout bulbs in each taillight will come on. The blackout stoplight will come on when both steering levers are pulled to brake the carrier.
2. **Operating the M19 Infrared Periscope** (figures 2 through 5). When required for blackout driving, the M19 infrared periscope is installed in the driver's hatch and operated as shown in figures 3, 4, and 5.

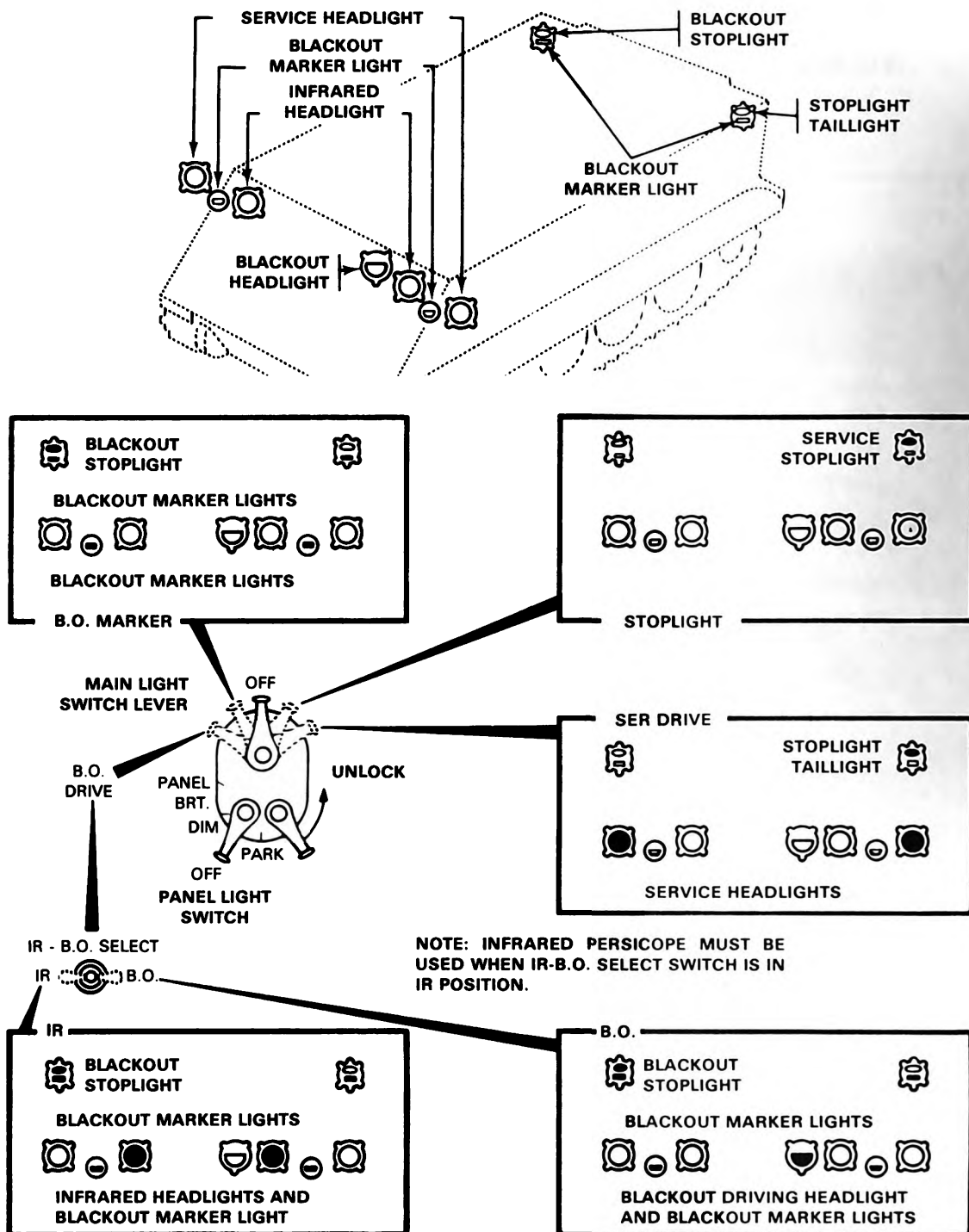
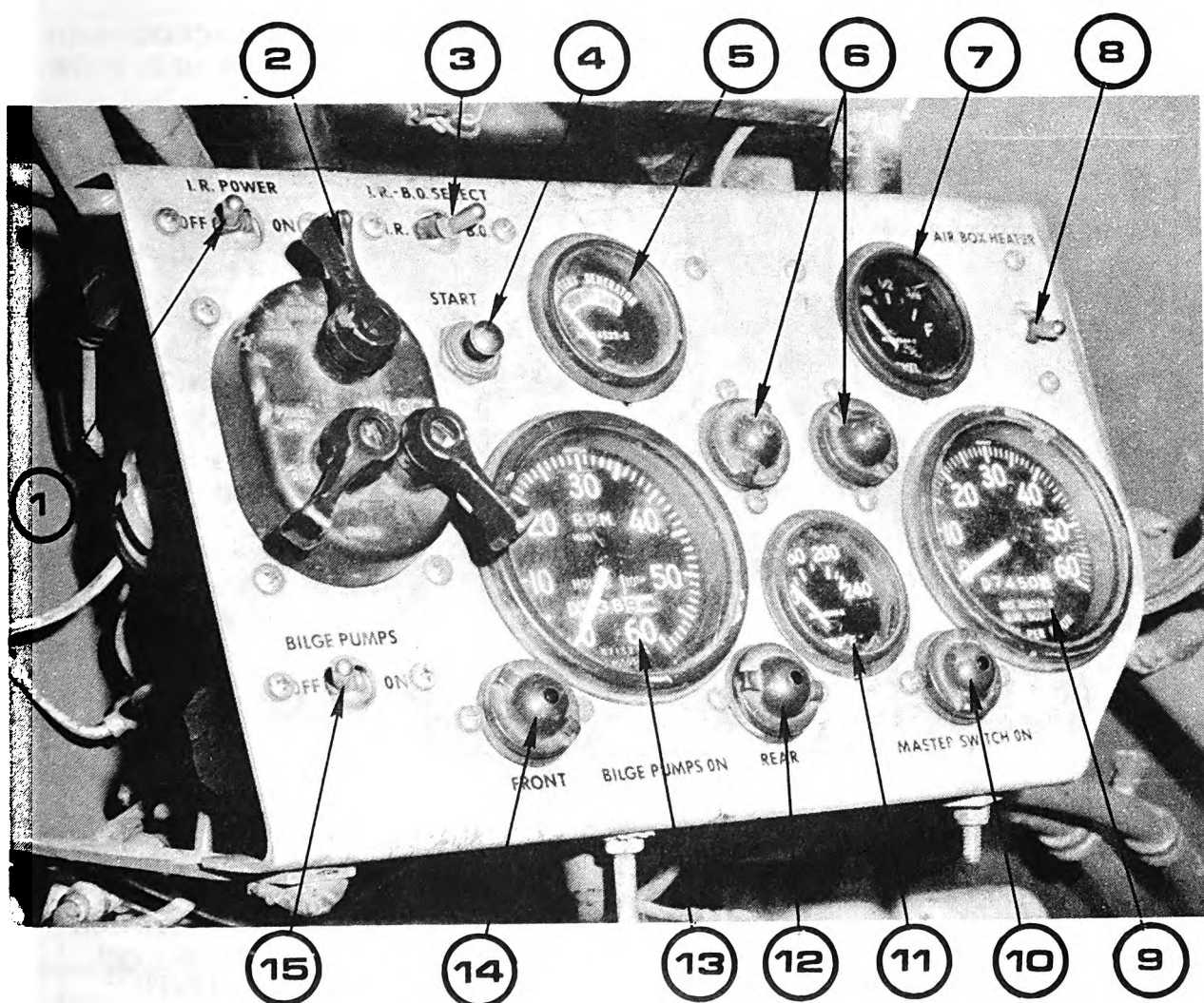


Figure 1.

2-VI-B-6.2



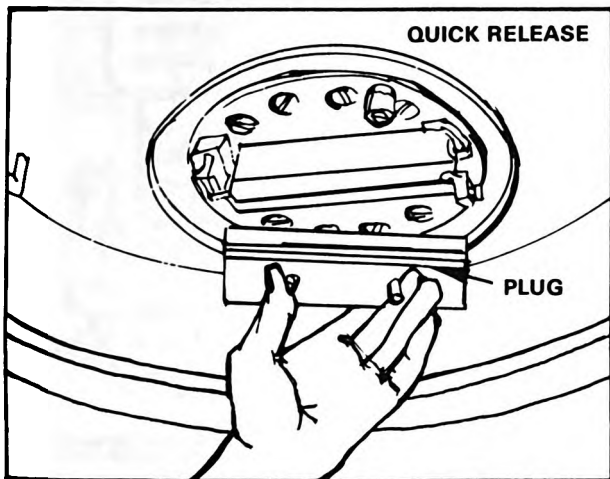


1—I.R. POWER SWITCH  
 2—LIGHTS SWITCH ASSEMBLY  
 3—I.R.-B.O. SELECT SWITCH  
 4—START SWITCH  
 5—BATTERY GENERATOR INDICATOR  
 6—PANEL LIGHTS  
 7—FUEL INDICATOR  
 8—AIR BOX HEATER SWITCH

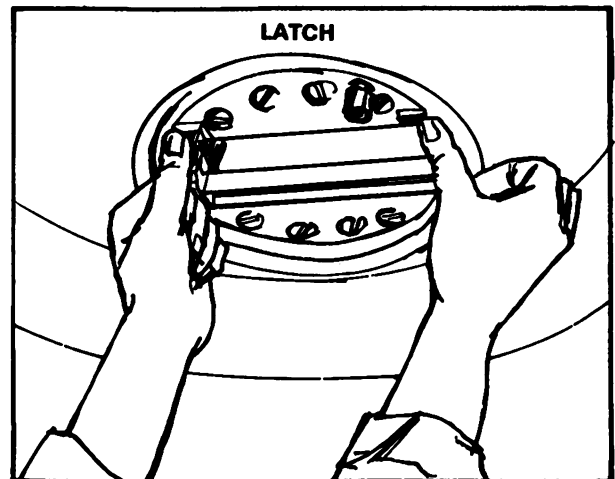
9—SPEEDOMETER  
 10—MASTER SWITCH ON INDICATOR LIGHT  
 11—ENGINE TEMPERATURE INDICATOR  
 12—REAR BILGE PUMP ON INDICATOR LIGHT  
 13—TACHOMETER  
 14—FRONT-BILGE-PUMP-ON INDICATOR LIGHT  
 15—BILGE PUMPS SWITCH

*Figure 2.*

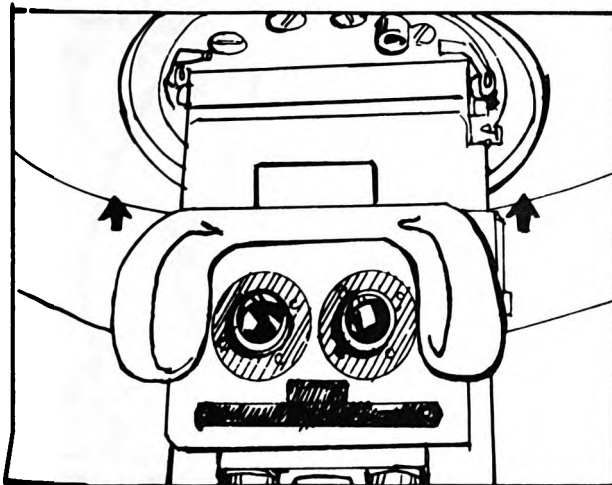




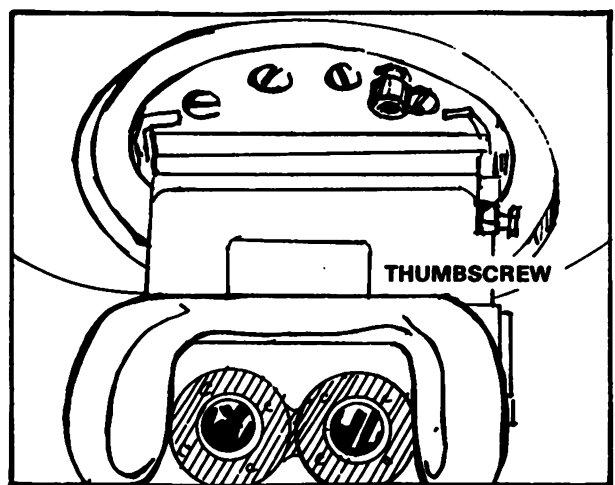
A. Remove plug from quick release.



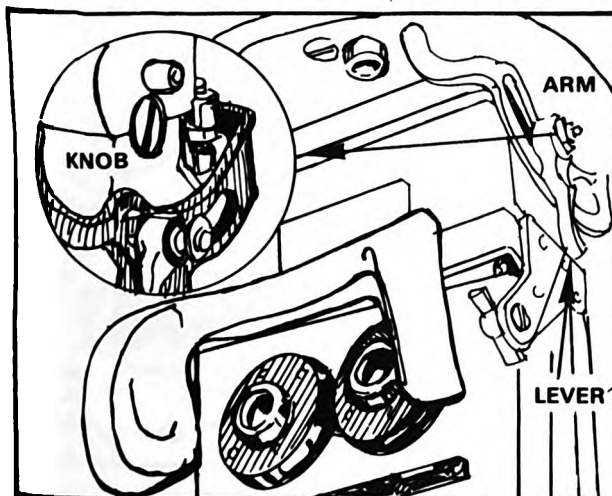
B. Push both periscope latches forward.



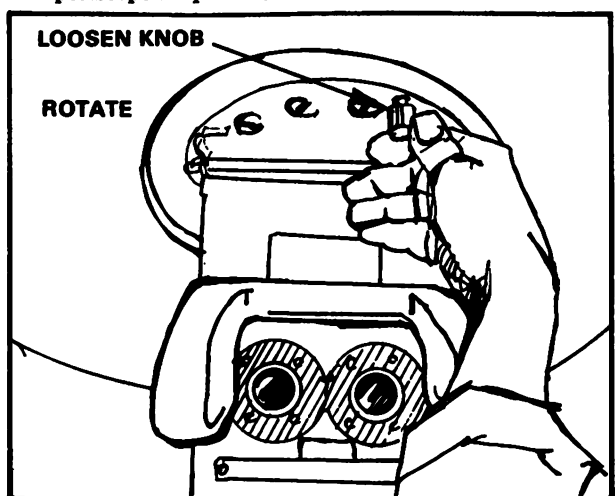
C. Carefully insert periscope and push upward.



D. Turn locking thumbscrew clockwise to secure periscope in quick release.

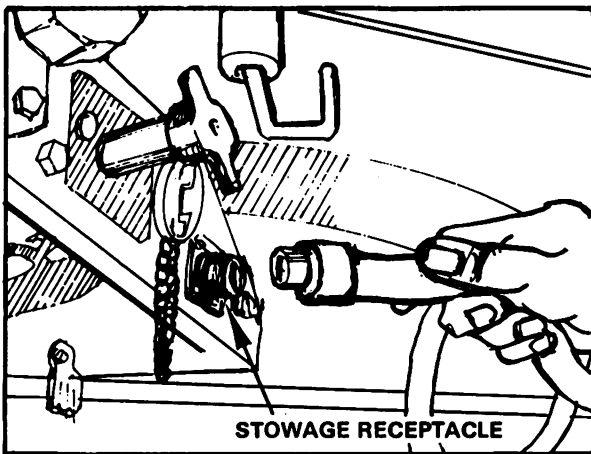


E. Loosen elevation locking lever, and set arm adjusting knob so both ends of elevation arm contact quick release.

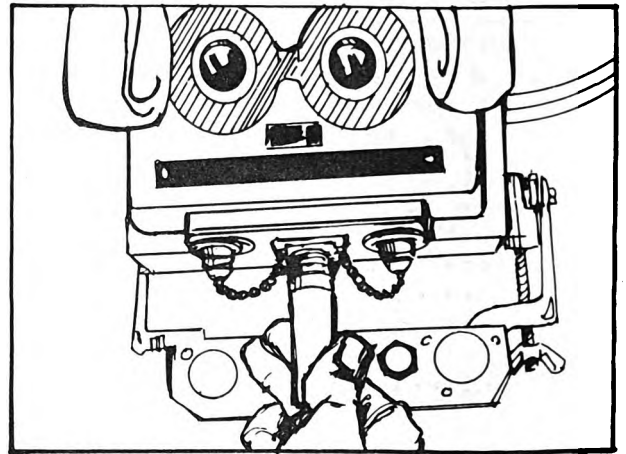


F. Loosen azimuth locking knob, and rotate periscope to check operation.

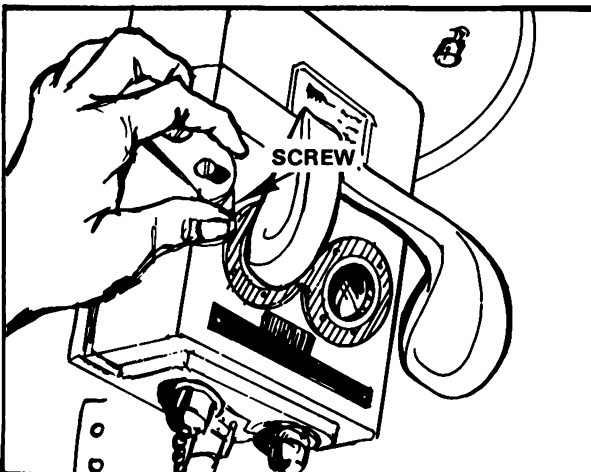
Figure 4.  
2-VI-B-6.5



G. Remove periscope power cable from stowed position.



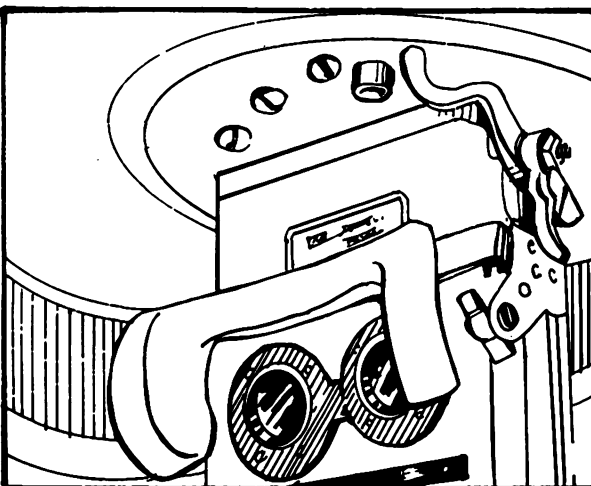
H. Connect cable to periscope. Turn master switch ON, infrared power switch ON, and main light switch to B.O. DRIVE.



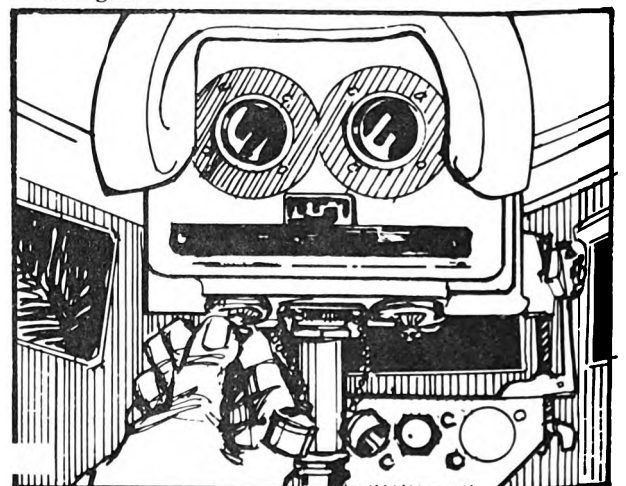
I. Loosen clamping screw, and adjust headrest.



J. Adjust periscope in azimuth, and tighten azimuth locking knob.



K. Adjust periscope in elevation, and tighten locking lever.



L. Focus each eyepiece with adjusting screw.

Figure 5.  
2-VI-B-6.6

**WARNING:** The infrared powerpack must be completely de-energized before the power cable is disconnected. The power cable must be installed in the periscope, not stowed before power is turned on. Failure to turn both the main light switch lever and infrared powerpack switch (figure 3) to OFF positions before disconnecting the cable will result in arcing, which may cause injury to personnel and damage to equipment. Before disconnecting the cable from periscope after use, wait 1 minute until residual charge in the system has drained off and then immediately move cable from periscope to stowage plug on master switch panel and secure receptacle down. Do not under any circumstances touch end of cable when moving from one plug to another because voltage of powerpack exceeds 16,000 volts.

#### **REFERENCES:**

TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (chap 2, pages 2-7 thru 2-10)  
TM 9-2350-259-10, Operator's Manual: Combat Vehicle, Antitank, Improved TOW Vehicle, M901



TASK NUMBER: 071-333-6504

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**OPERATE A TRACKED VEHICLE IN WATER**

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**CONDITIONS:**

In daylight at a field location, given an unfordable water obstacle, applicable TM (TM 9-2300-257-10 for M113A1; TM 9-2350-259-10 for M901), safety equipment as prescribed by TM 9-2300-257-10 and local SOP/regulations, and one of the following tracked vehicles:

1. M113A1 armored personnel carrier.
2. M901 improved TOW vehicle.

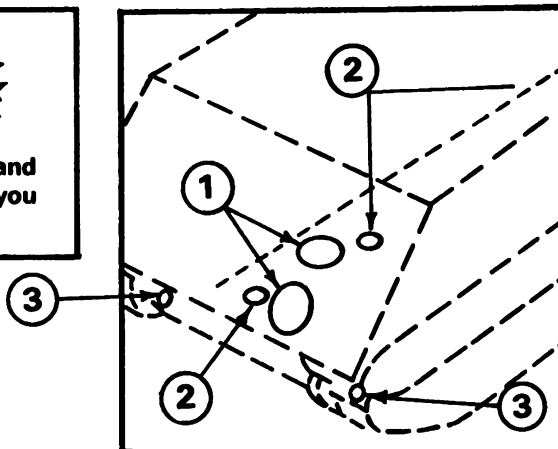
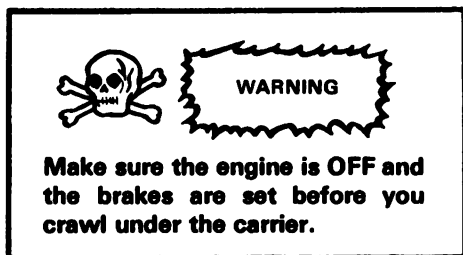
**STANDARDS:**

1. Prepare and drive the given tracked vehicle across the water obstacle.
2. Comply with all safety measures outlined in the performance measures.

**PERFORMANCE MEASURES:****1. PREPARATION BEFORE ENTERING WATER.**

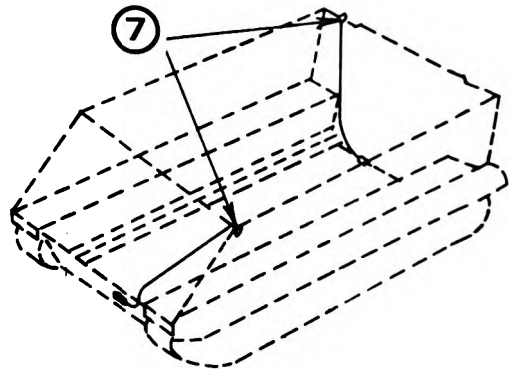
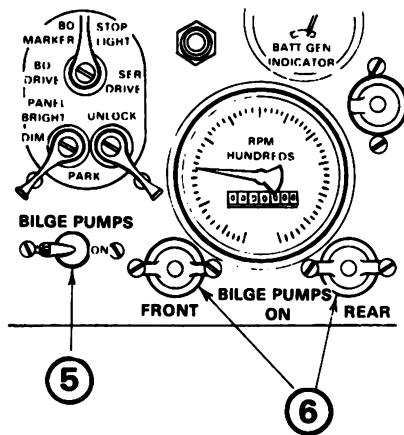
**CAUTION:** Be sure the drain plugs and access covers are in place straight and tight. They have to be flush with the bottom of the carrier and be tilted. Also check that the fuel filler cap is snug, not held out of place by the keeper chain.

- a. Check the hull access covers (1), drain covers (2), and final drive recess plugs (3). Make sure they are all in place and tight.

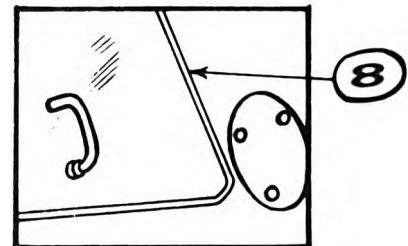


b. Check the track shrouds to be sure they're in good condition and installed. Unless it's an emergency, don't try to swim the carrier without the shroud. You need them to let the tracks drive and steer the carrier in the water.

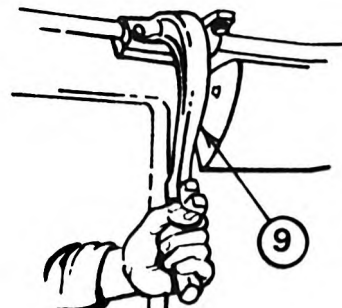
c. Run the bilge pumps to make sure they're working. With the carrier on level ground, turn the bilge pumps switch ⑤ ON. The FRONT and REAR bilge pump indicator lights ⑥ should both come on. If there's water in the bilges, you should see it coming out the bilge pump outlets ⑦. If you don't see streams of water, put your hand over the outlets and feel for streams of air.



d. Make certain powerplant door ⑧ is secure.

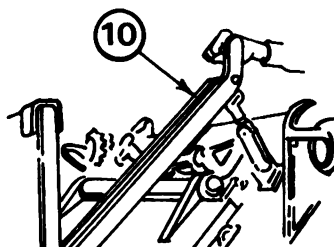


e. Raise and lock ramp, and make sure handle ⑨ goes all the way forward so ramp is tight and secure against seal.





- f. Extend and lock trim vane ⑩
- g. Install periscopes.
- h. Turn on interior lights, if tactical situation permits.



- i. Close and lock all hatch covers except driver's hatch cover.
- j. Check load distribution.



**WARNING**

**Incorrect distribution of cargo can cause carrier to swamp.**

**k. Personnel Safety.**

- (1) Don't fasten seat belts.
- (2) Remove all web gear and packs.
- (3) Specify an order of exit for the men in the carrier.
- (4) If water rises above floor plates, personnel should climb to the top deck.

**2. ENTERING WATER (WITH BILGE PUMP OPERATING).**

- a. Do not enter water with waves higher than 1 foot.
- b. Select firm, gradual slop (if not designated), free of obstacles (rocks, stumps, and deep drops). Enter head on; not at an angle.
- c. Enter using 1-range, not exceeding 10 mph.
- d. Be on the ball once the carrier is fully in the water — if it looks like you'll be swamped, back off if you can. If not, give it the gun to raise the front and get waterborne.



**WARNING**

**If you gun the engine when the carrier is floating level, the rear could sink. Only gun the engine if you're nose-down, taking water, and can't back up.**

### 3. DRIVING IN WATER

a. When in the water, shift 1-2 range. Use this range for all water driving except stopping.

b. To steer, use the pivot steer levers - NOT the differential steer levers.

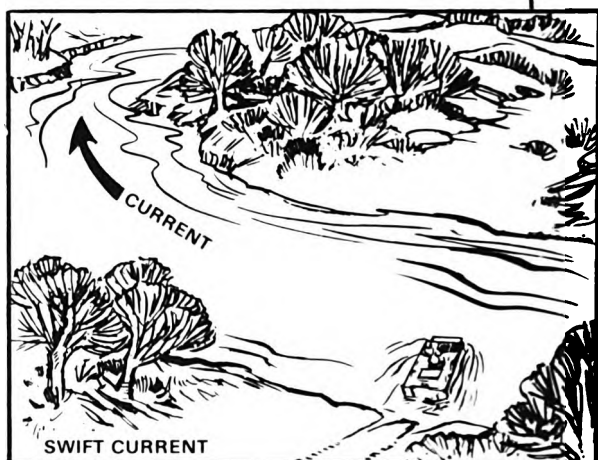
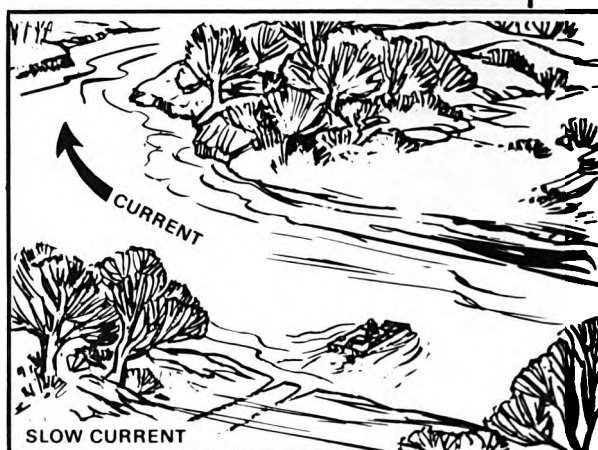
c. Maximum speed in water is 2 to 3 mph. Speedometer readings are not accurate when afloat. You'll have to guesstimate.

d. To keep from overshooting turns, release the pivot steer levers before your turn is complete. Allow momentum of carrier to complete turn.

e. To cross a slow-current stream, head straight across and let the current carry you downstream until you reach the other side. If you must exit directly across from the point of entry, head upstream and cross at an angle.

f. Avoid crossing swift current stream, but if you must, head carrier diagonally downstream.

g. If you hit an underwater obstruction, take it easy. Let up on the gas pedal and pull back on the pivot steer levers to stop the tracks. Then shift to R (reverse) and back off. Don't try to go through obstacles; carrier can roll over or get hung up.





h. Always keep your engine revved. Drop to low idle only to shift and to brake. Even when in N, keep the engine revved to about 1200 rpm.

i. Avoid sudden braking or deceleration action as this will pitch the carrier in the direction of travel. A deep forward pitch can swamp the engine compartment.

j. When swimming, the carrier nose is raised. This keeps the bilge water from reaching the forward pump. Slow down or stop and let the forward bilge pump catch.

k. If carrier shows signs of sinking, step on the gas and head for the nearest shore.

#### 4. STOPPING IN WATER

a. Plan and start your stops long before your stopping point is reached. Keep the carrier's momentum in mind and work with it.

b. Let up on the gas pedal, pull back on the pivot steer lever, and stop the tracks.

c. When tracks have stopped, release the steer levers and shift in R (reverse) and step on the gas pedal.

d. Let up on the gas pedal when the carrier's forward motion has stopped.

## 5. BACKING IN WATER.

Use R (reverse) as the main driving force. To brake or slow down, shift into 1-2 range after stopping tracks.

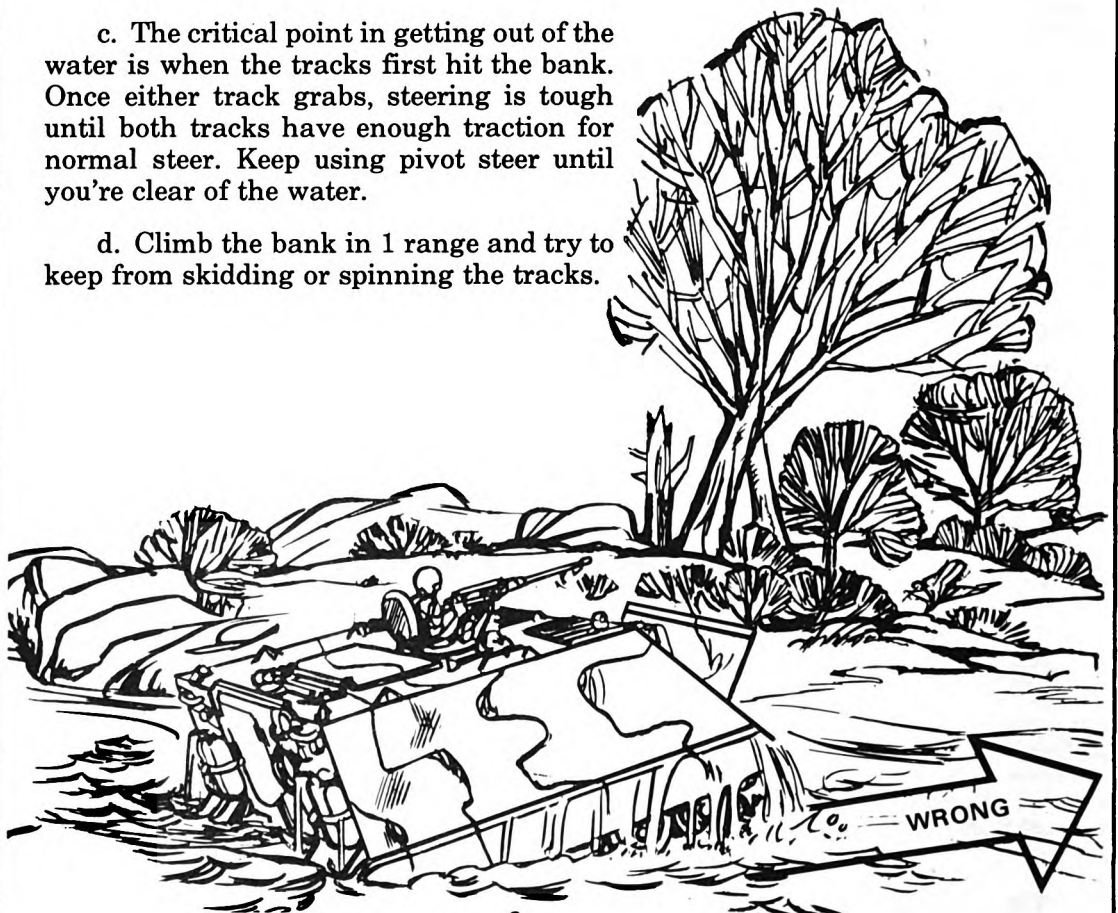
## 6. LEAVING THE WATER.

a. Look for a bank clear of obstacles, (rocks and tree stumps). Maneuver your carrier to come straight into the bank (not at an angle) so both tracks will hit the bank at the same time.

b. Ease up on the gas pedal, come in slow and easy and when you hit the bank shift into 1 range.

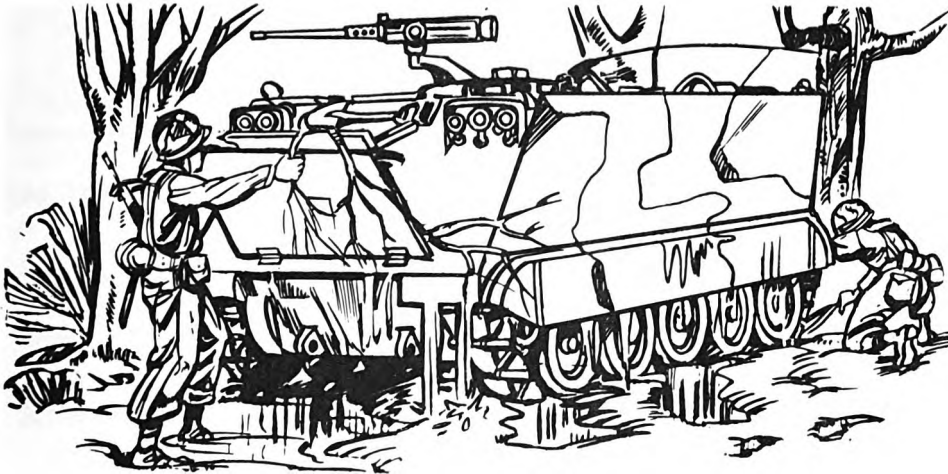
c. The critical point in getting out of the water is when the tracks first hit the bank. Once either track grabs, steering is tough until both tracks have enough traction for normal steer. Keep using pivot steer until you're clear of the water.

d. Climb the bank in 1 range and try to keep from skidding or spinning the tracks.



## 7. MAINTENANCE AFTER WATER OPERATION.

- a. Look over the trim vane for damage and clear out any debris.
- b. Turn off the bilge pumps when the bilge is all pumped out.



c. The carrier will resist water entering into bearings and operating parts. Running through shallow water (12 inches deep or less) should require no special service except a check of the roadwheel hubs to make sure there's no water in them. After swimming or deep-water fording, check the roadwheel hubs and final drives for water in the oil and get organizational maintenance to give the carrier a chassis lubrication (LO 9-2300-257-12) as soon as you can.

### d. Drain and flush the hull.

(1) Front. Remove two front hull and final drive drain plugs. Slope the carrier front down and to the right side. Open the powerplant door and wash down all components. But take it easy. Never use a high pressure water hose. Never saturate electrical components. Wash off all unpainted areas. Then slope the carrier to the left and flush out the final drive and hull plates. After all the water is out, put the plugs back.

(2) Rear. Elevate the front of the carrier. Remove the hull drain plugs. Lower the ramp, remove three floor plates and wash out the hull. When clean and drained, put the drain plugs and floor plates back in.

(3). After operating in salt water, take out all the hull drain plugs and access covers as soon as you can and wash the outside and flush the bilges with fresh water. Replace all drain plugs and access covers.

## REFERENCES:

FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (app A, pages A-25 thru A-31)

TM 9-2300-257-10, Operator's Manual: Carrier, Personnel: Full Tracked, Armored, M113A1, Aug 78 (chap 2, pages 2-91 thru 2-98)

TM 9-2350-259-10, Operator's Manual: Combat Vehicle, Antitank, Improved TOW Vehicle, M901



**TASK NUMBER: 071-333-6509**

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**RECOVER A TRACKED VEHICLE USING  
FIELD EXPEDIENTS**

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**CONDITIONS:**

During combat or training under all types of weather conditions, given a disabled tracked vehicle requiring recovery (the vehicle is equipped with basic issue items), other applicable materials for expedient recovery, or a similar vehicle.

**STANDARDS:**

Recover the disabled tracked vehicle using one of the following:

1. Similar vehicle if available for recovery.
2. Vehicle's basic issue items for self-recovery.
3. Any of the expedient methods below:
  - a. Anchoring the tracks.
  - b. Using an armored personnel carrier anchoring track (APCAT) device.
  - c. Using a capstan kit.

**PERFORMANCE MEASURES:**

1. **Methods of Recovery.** There are four methods of vehicle recovery using organizational personnel and equipment.
  - a. **Winching.** Operations performed using winches on special purpose vehicles or cargo-type vehicles.
  - b. **Towing.** Operations performed using towing capabilities of similar or special purpose vehicles. This is the quickest recovery method.
  - c. **Lifting.** Operations performed using special purpose vehicles.
  - d. **Expedients.** Operations performed when other methods are not adaptable to the situation or when additional vehicles and equipment are not readily available.
2. **Levels of Recovery.** Recovery operations performed within an organization are divided into levels. Levels are based on personnel who perform the operations and equipment available to them.

a. **Platoon Level.** Recovery is performed by vehicle drivers and crews, under supervision of squad, section, or platoon leader. At this level, winching, towing, and expedient methods of recovery are employed, using platoon vehicles and equipment.

b. **Company and Battalion Levels.** Recovery is performed by general vehicle repairmen or recovery specialists under the supervision of the recovery chief, using winching, towing, and lifting methods of recovery with special purpose vehicles. Because of the increased number of special purpose vehicles at battalion level, a greater recovery capability exists there than at company level.

**3. Procedure for Recovery.** During any recovery operation, a proven procedure should be used to insure quick and safe accomplishment. A haphazard approach to a recovery problem or the trial and error method can only result in prolonged immobility of the disabled vehicle, loss of valuable time, damage to equipment, and possible injury to personnel. The following eight-step recovery procedure, in the proper sequence, should be used in any recovery involving winching.

#### **RECOVERY PROCEDURE**

**RECONNOITER AREA**

**ESTIMATE SITUATION**

**CALCULATE RATIO**

**OBTAIN RESISTANCE**

**VERIFY SOLUTION**

**ERECT RIGGING**

**RECHECK RIGGING**

**YOU ARE READY**

**4. Equipment and Support for Recovery.** The amount and type of equipment employed as the source of effort during any recovery operation is dependent upon the level of recovery, as discussed in paragraph 2. Every effort should be made by the drivers and crews to accomplish the recovery before calling on support from a higher level. During combat it may be of the utmost importance that cargo reach its destination at a definite time or that personnel or cargo be picked up at a given time or that a combat vehicle be at a given place at a specific time. Recovery support should be called upon only when the similar vehicles are not adaptable to the situation or when the tactical situation does not permit their use. **ENGAGED COMBAT VEHICLES SHOULD NEVER BE DIVERTED FOR THE PURPOSE OF RECOVERY.**

**5. Use of Similar Vehicles for Recovery.** The use of similar vehicles for recovery usually constitutes the **QUICKEST METHOD** of recovery because similar vehicles are most readily available. The number of tracked vehicles required for a specific recovery is dependent upon the resistance to



be overcome, the type of disablement, and the condition of the terrain on which the towing vehicles must be operated. The rigging is accomplished using the vehicle tow cables attached to the tow hooks of the vehicles. All main battle tanks carry two tow cables; light tracked vehicles carry one tow cable.

a. When two tow cables are used between two vehicles, the cables should be crossed. This prevents them from entangling in the tracks on turns and maintains alinement of the vehicles (figure 1). If a greater working distance between the pulling vehicle and a mired vehicle is required, two cables can be joined together by using tow hooks.

b. To recover a mired vehicle using a similar vehicle:

- (1) Position towing vehicle and shut off engine.
- (2) Attach tow cables to tow hooks at rear of towing vehicle.
- (3) Attach tow cables to tow hooks of mired vehicle.

**NOTE: Cables must be crossed.**

- (4) Start towing vehicle.
- (5) Shift towing vehicle transmission into 1st range and slowly take up slack in cables.
- (6) Stop towing vehicle.
  - (a) Shift transmission to neutral.
  - (b) Lock brakes.
  - (c) Shut off engine.
- (7) Recheck rigging.

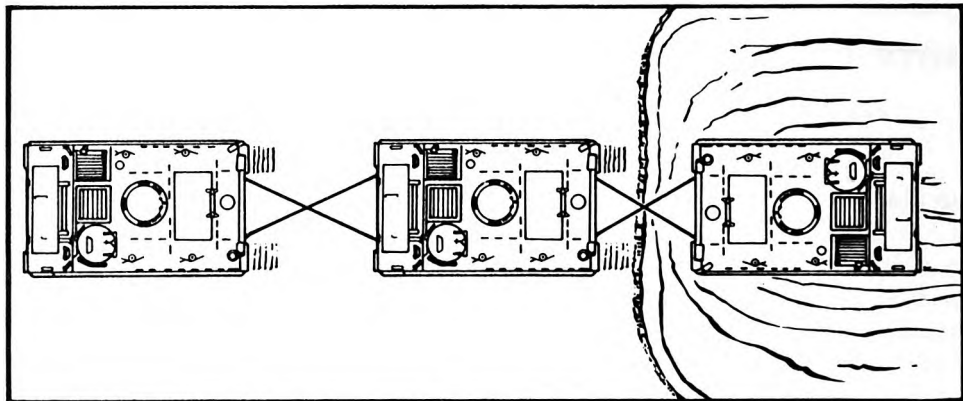
**CAUTION: Insure that all safety keys are installed in tow hook pins.**

- (8) Start towing vehicle.
  - (a) Shift transmission to 1st range.
  - (b) Release brakes.
- (9) Instruct driver of mired vehicle to prepare his vehicle for movement.
- (10) Slowly apply power and move forward.

**NOTE: Driver of mired vehicle must apply power to assist in recovery.**

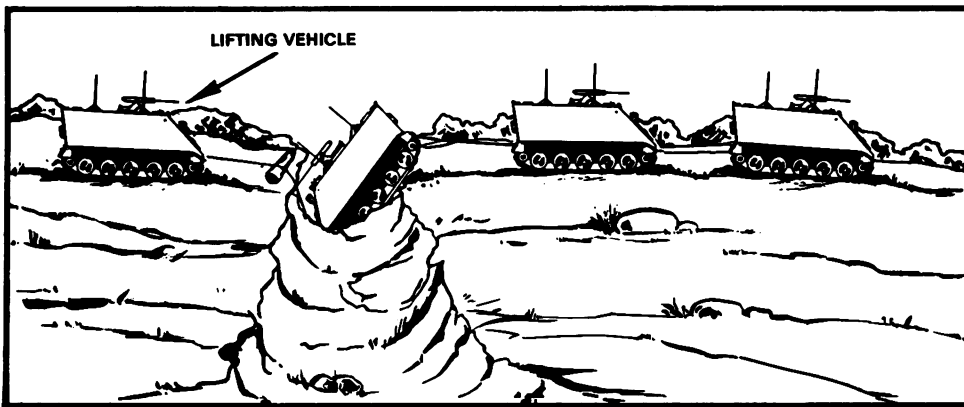
- (11) Tow the mired vehicle until both vehicles are on a hard surface.
- (12) Instruct driver of towed vehicle to slowly move forward to provide slack in the towing cable.
- (13) Stop recovered vehicle.
- (14) Place transmission of both vehicles in neutral, lock brakes, and shut off engines.
- (15) Disassemble and stow rigging.

If two towing vehicles are required for an operation, only one tow cable is required between the towing vehicles because the strength of one tow cable is slightly greater than the pulling effort of the second pulling tank; however, when two tow cables are available, they should be used to maintain alinement and equalize the pulling effort.



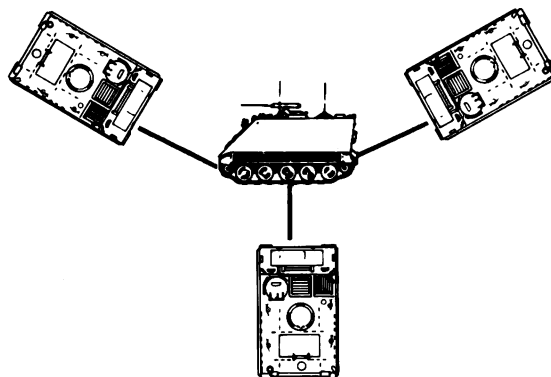
*Figure 1. Towing mired APC, using two similar vehicles.*

c. The recovery of a nosed tracked vehicle (figure 2) may require as many as three similar vehicles, depending on the degree to which it is nosed and the condition of the terrain on which the pulling vehicles must operate. In extreme situations, a source of effort may be necessary to lift the front of the nosed vehicle. To use a lifting vehicle, two or more tow cables should be connected together to obtain a greater working distance between the nosed vehicle and the lifting vehicle. The lifting vehicle should be positioned facing the nosed vehicle. The cables of the pulling vehicles are connected in the same manner as for recovery of a mired vehicle. Power should be applied to all the assisting vehicles at the same time, until the front of the nosed vehicle is raised and starts moving rearward, then the lifting vehicle should move forward slowly supporting the vehicle until it is recovered. If there has been any spillage of oil or fuel in the nosed vehicle, its engine should not be operated until such spillage has been cleaned up.



*Figure 2. Recovering nosed APC with similar vehicles.*

d. An overturned tracked vehicle can be uprighted by using three similar vehicles (figure 3). One vehicle is used to pull the overturned vehicle upright; the other two vehicles are used to hold and retard the fall of the overturned vehicle to prevent its crashing down on the suspension system. Two cables should be connected together in pairs to allow safe working distance. The cable used to upright the overturned vehicle should be connected to the nearest center roadwheel arm support housing on the high side of the overturned vehicle. Never connect to any other part of the suspension system, turret, or the tiedown eyes. The two vehicles used for holding should be positioned at a 30° to 45° angle from the overturned tank with their cables connected to the two hooks on the high side of the overturned vehicle. The holding vehicles are so positioned to prevent damage to the cables or the fenders and lights of the overturned vehicle as it is uprighted. Drivers of the holding vehicles shift to low range; the pulling vehicle applies power gradually in reverse, while the holding vehicles move forward only enough to keep their cables taut until the overturned vehicle passes through the point of balance. As the overturned vehicle passes through the balance point, the holding vehicles move forward slowly, supporting the overturned vehicle and lowering it onto its suspension system. Because of spilled oil and fuel that will normally be present, extreme caution must be exercised to prevent smoking or open flames near the overturned vehicle.



*Figure 3. Recovering overturned APC with similar vehicles.*

**6. Recovery Expedients.** Military operations will require vehicles to operate in remote areas where, should disablement occur, assistance would not be readily available. Under these conditions, the driver or crew must attempt self-recovery by the use of expedients. An expedient is an improvised method and is accomplished with the materials on hand.

a. **Anchoring Tracks.** Vehicles often become bellied (high-centered) on stumps, rocks, and dry ridges, or in mire. In this position, vehicles are immobilized because of the lack of traction.

(1) To recover a bellied vehicle in mire (figure 4), obtain a log long enough to span the width of the vehicle and of sufficient diameter to support the vehicle weight. The log is placed against both tracks, and a tow cable is placed so one end of the cable goes over the log and through the tracks from the inside. The other end of the tow cable is placed underneath the log, and the ends of the cable are connected together with a tow hook on the outside of the track to facilitate disconnecting. The same procedure is followed to attach the log to the track on the opposite side of the vehicle. By gradually applying power to the tracks, the slack in the tow cables will be taken up, pulling the log underneath the tracks until it comes in contact with the obstacle, anchoring the tracks and causing the vehicle to move.

(2) Follow these steps to self-recover a tracked vehicle bellied in mire:

(a) Erect rigging.

1. Place log against both tracks.
2. Position tow cables (both tracks).
3. Connect ends of cable using tow hooks (both tracks).

(b) Recover tracked vehicle.

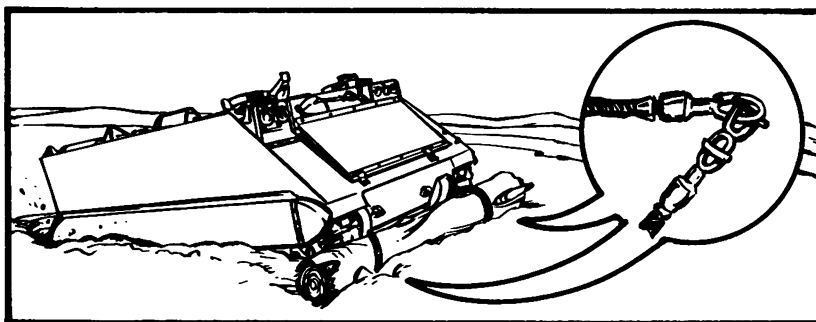
1. Start engine.
2. Release brakes.
3. Shift transmission selector lever to desired position.
4. Gradually apply power to tracks.

(c) Stop vehicle.

1. Shift transmission selector lever to neutral or park position.
2. Lock brakes.
3. Shut off engine.

(d) Disassemble and stow rigging.

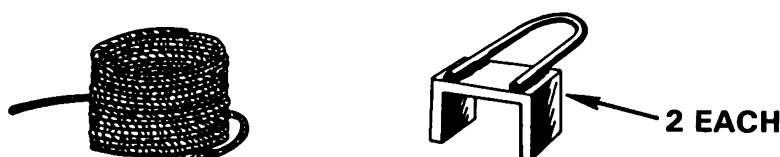
**CAUTION:** Care must be taken to stop the vehicle before the log reaches the fenders to prevent damage to the fenders and tow cables.



*Figure 4. Recovering a bellied vehicle in mire.*

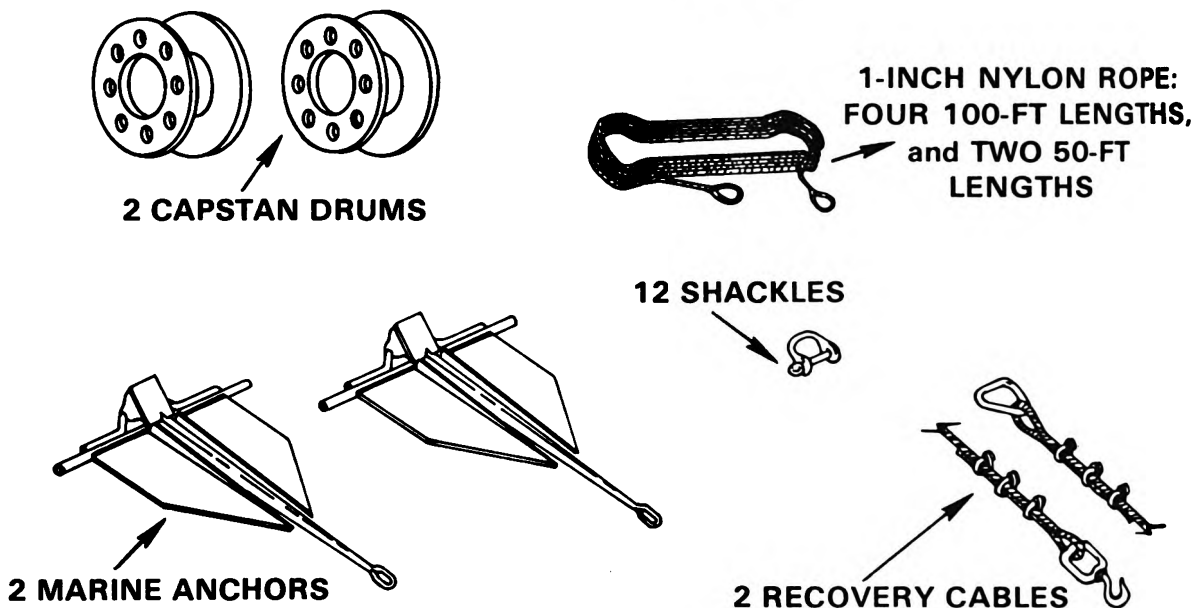
(3) For a bellied disablement other than mire, the tracks can be anchored using two tow cables. Connect the tow cables together with a tow hook and attach the cables to both tracks by passing the ends of the cables through the tracks from the outside and attaching them to the standing parts of the cables with two hooks. When power is applied to the tracks, the cables will contact the obstacle and anchor the tracks. The same caution must be exercised as outlined in (1) above.

b. APCAT Device. APCs may fail to exit the water after swimming due to steep banks or adverse terrain conditions. As an aid to water exit, the APCAT expedient can be used. The APCAT expedient kit consists of one pair of track anchor blocks (fabricated locally) and 200 feet of 1-inch fiber rope (figure 5). The track anchor blocks are placed in the blocks to suitable anchorages. As power is gradually applied, the tracks will anchor themselves to the blocks and cause the vehicle to move. This expedient may also be used in mire or bellied situations.



*Figure 5. APCAT expedient kit.*

c. Capstan Kit (figure 6). (This kit may be ordered through your maintenance shop.) When leaving water after swimming operations, an APC may become disabled because of the steep angle of the bank, the muddy or slippery surface of the bank, or a combination of both, and cannot exit. A capstan expedient can be used for a self-recovery. The capstan kit consists of one pair of capstan adapters that bolt to the drive sprocket hub, one pair of capstan drums with mounting tee bolts, nylon rope, and one pair of ground anchors. Normally, the capstan adapters are permanently mounted to the drive sprocket hubs with the metal shrouds plates cut away.

**CAPSTAN KIT CONSISTS OF:***Figure 6. Capstan kit.*

The capstan drums can be very quickly installed to the adapters with the drum tee bolts. The rope is secured to each mounted capstan drum, and wrapped two or three turns around the drums on both sides of the vehicle. Care must be taken to insure that the anchors are positioned in line with the capstan drums. The ropes must extend from the underside of the capstan drum before they are tied to their respective anchors. By applying power to the tracks, the ground anchors will embed in the ground, and the winching action of the capstan drums will cause the vehicle to move. To recover a tracked vehicle using the capstan kit:

- (1) Lock brakes and steering levers.
- (2) Stop engine.
- (3) Remove capstan kit from stowed position.
- (4) Remove mud and debris from around sprocket wheels.
- (5) Attach drum assemblies to sprocket wheels.
- (6) Position anchors at desired location,
- (7) Connect ropes to anchors.
- (8) Attach anchor recovery cables to anchors.
- (9) Attach ropes to drums and take up slack.

**NOTE:** Ropes must be pulled tight and kept away from drum to prevent them from winding into the drum or catching in the track.

- (10) Start engine.
- (11) Release brakes and steering levers.
- (12) Position range selector in 1st range.
- (13) Apply power slowly until anchors are embedded and carrier starts forward motion.
- (14) Continue forward motion until carrier is free of obstacles.
- (15) Stop carrier.
  - (a) Lock brakes and steering levers.
  - (b) Position range selector in neutral.
  - (c) Stop engine.
- (16) Disassemble capstan kit.
- (17) Recover anchors.
- (18) Stow capstan kit in travel position.

**REFERENCES:**

**FM 5-34, Engineer Field Data, Sep 76 (chap 16, page 367, para 16-7)**  
**FM 20-22, Vehicle Recovery Operations, Jul 70 (chap 2, pages 5 & 6, para 3; chap 5 and 6, pages 58 thru 108, para 45 thru 85)**





**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION VII**  
**LEADERSHIP AND TRAINING**

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**TASK SUMMARIES**



**TASK NUMBER: 071-328-5301**

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**INSPECT PERSONNEL/EQUIPMENT**

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**CONDITIONS:**

Given personnel or equipment to be inspected, specified amount of time, inspection site and unit SOP for inspections.

**STANDARDS:**

Within the time specified, inspect personnel or equipment and note deficiencies.

**PERFORMANCE MEASURES:****1. Personnel**

- a. Start at the head. Check headgear, haircut, and shave.
- b. Inspect collar insignia and awards.
- c. Check gig line and belt buckle.
- d. Check footgear.
- e. Check uniform for general appearance, fit, and patches.
- f. Check Identification Card (DD Form 2A) and I.D. tags.

**NOTE:** Before inspecting, be thoroughly familiar with unit standards.

**2. Equipment**

- a. Before inspection, study applicable TM. Pay particular attention to section on preventive maintenance checks and services and the basic issue items list.
- b. Begin inspection at a readily recognizable point on equipment.
- c. Inspect in an orderly sequence. This saves motion and eliminates chances of missing important items.
- d. Note deficiencies as you find them. Don't try to remember all of them.
- e. Inspection should be complete when you return to the starting point.

**REFERENCES:**

**FM 22-5, Drill and Ceremonies, C1, Nov 71 (chap 7, sec III, pages 49-54)**

**TASK NUMBER: 071-328-5302**

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**SUPERVISE MAINTENANCE  
ON INDIVIDUAL AND TOE EQUIPMENT**

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**CONDITIONS:**

Given personnel, with equipment to be maintained, a maintenance site, and specified amount of time.

**STANDARDS:**

Within time specified, direct personnel assigned to your unit in the proper maintenance of individual or TOE equipment to meet Army standards as listed in applicable TM or other publications.

**PERFORMANCE MEASURES:**

**To supervise maintenance on individual and TOE equipment:**

1. Determine what is to be maintained.
2. Obtain applicable TM.
3. Brief personnel on maintenance to be performed and standards.
4. Assign tasks as stated in TM, when applicable.
5. Allocate resources if necessary.
6. Spot check (DO NOT OVER SUPERVISE).
7. Obtain assistance if needed.
8. Inspect completed work and make corrections if necessary.
9. Report completion of work to your supervisor.

**NOTE: Be sure that the task is understood, supervised, and accomplished.**

**REFERENCES:**

**FM 22-100, Military Leadership, Jun 73 (chap 2, page 2-11)**



**TASK NUMBER: 071-328-5304**

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**ENFORCE PREVENTIVE MEDICINE PROGRAM  
(INCLUDES PERSONAL HYGIENE)**

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**CONDITIONS:**

Your squad has been given the mission to conduct a march. As team leader, brief your men on preventive medicine measures that should be taken. A march can be tactical or administrative and can be conducted by road or cross-country, and can be conducted in daylight or darkness.

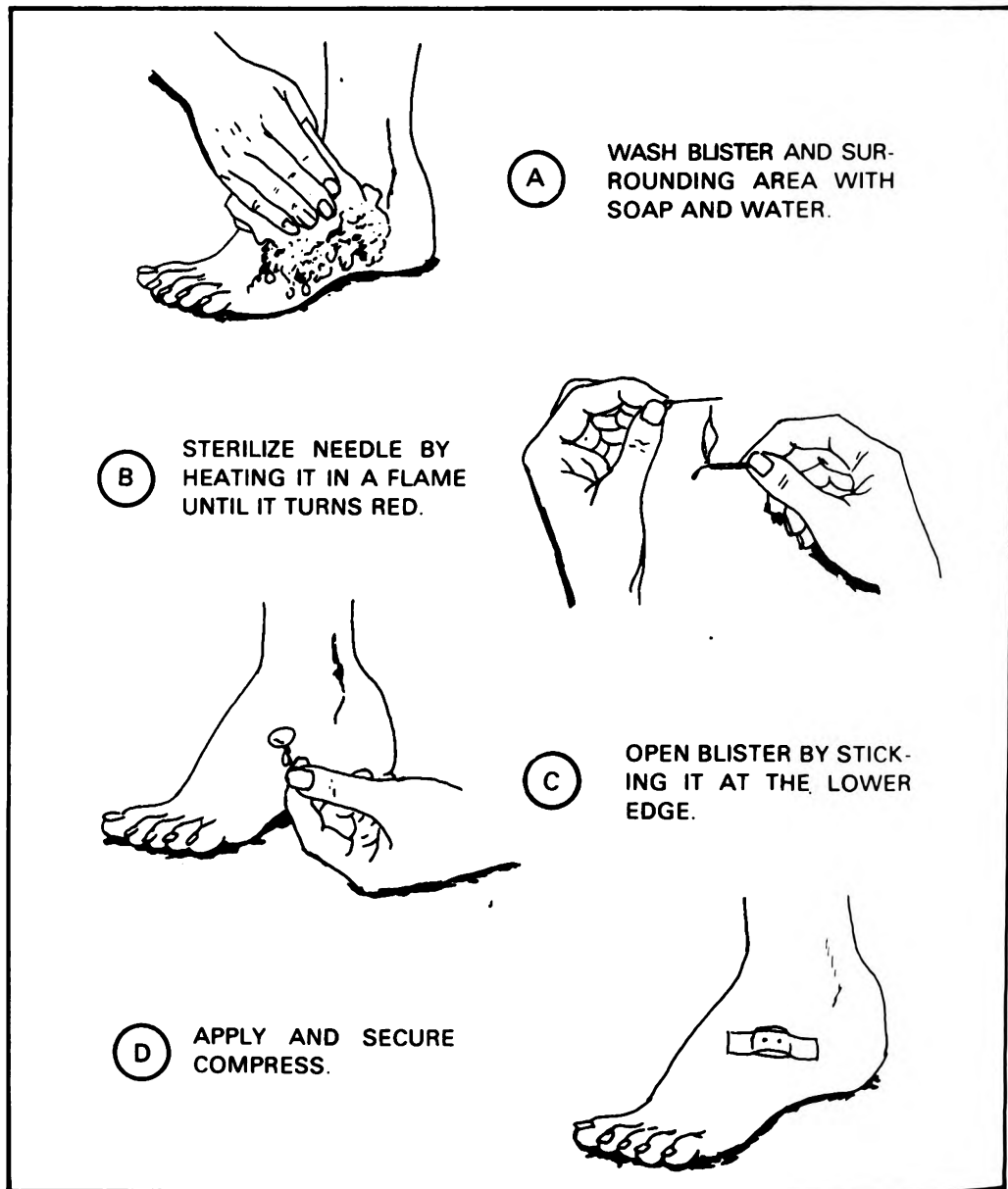
**STANDARDS:**

Prior to conduct of the mission, you will explain preventive medicine measures for:

1. Care of the feet prior to and during the march.
2. Purifying water with iodine tablets.
3. Disposal of human waste while on the march and during bivouac.
4. Climatological injuries, heat/cold. During conduct of the mission, inspect your subordinates to insure that they are complying with your instructions. Detect all failures to comply with your instructions and insure corrections are made.

**PERFORMANCE MEASURES:****1. Care of the Feet.**

a. Prior to the march, all men should be equipped with the proper type of correctly fitted, broken-in footgear, clean socks which are free of holes or knotty darns, and an adequate supply of foot powder. A soldier must never attempt to break in a new pair of shoes or boots on a long march. Blisters (figure 1), pressure spots, and infections should be treated and properly protected before the march starts.



*Figure 1.*



b. On the march, the feet should be kept as dry as possible. If socks become damp from perspiration or wet from water, they should be changed to dry ones at the first opportunity. If necessary, socks may be dried by putting them under the shirt around the waist. Tender pressure spots should be relieved promptly by adjusting gear or applying adhesive tape. Once or twice daily during the march, the feet should be dusted lightly with foot powder.

c. At rest periods, the feet should be inspected (from time to time). If possible, the feet should be washed during the noon break. It is helpful to elevate the feet while resting. This reduces congestion and swelling.

## **2. Purifying Water.**

a. Before iodine tablets are used, they should first be checked for physical change, as they lose their disinfecting ability in time. Tablets which are not steel gray in color, which are stuck together, or which are crumbled should not be used.

b. The following procedure is used in treating water in a canteen with iodine tablets.

(1) Fill canteen with the cleanest, clearest water available.

(2) Add one iodine tablet to a 1-quart canteen of clear water; add two tablets if the water is cloudy. Double these amounts for a 2-quart canteen.

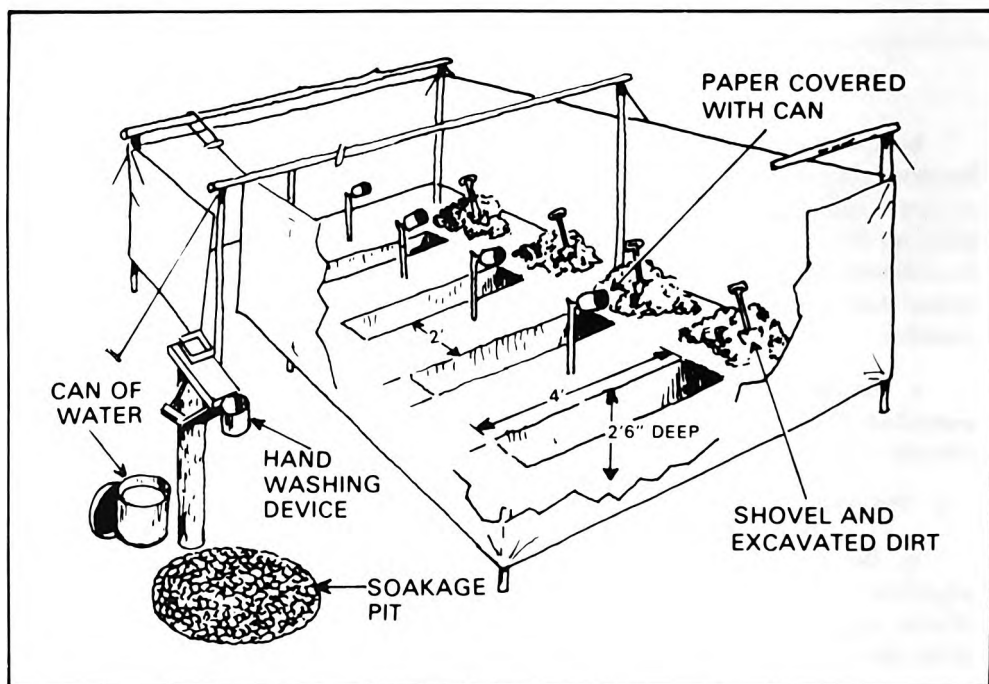
(3) Place the cap on the canteen loosely, wait 5 minutes then shake the canteen well, allowing leakage to rinse the threads around the neck of the canteen.

(4) Tighten cap and wait an additional 20 minutes before using the water for any purpose.

## **3. Human Solid Waste Disposal.**

a. When on the march, each person uses a "cat-hole" latrine during short halts. It is dug approximately 1-foot deep and is completely covered and packed down after use.

b. For overnight bivouac, the straddle trench is used (figure 2). Construction requirements are found in FM 21-10, paragraph 76.



*Figure 2.*

#### 4. Climatological Injuries.

##### a. Preventing heat injuries:

(1) **Water requirements:** The human body cannot be trained to function with less than the minimum amount of water it requires for cooling, waste elimination, and metabolism; any attempt to train the body to do so can be harmful and lead to heat injuries. Troops should be encouraged to drink water more frequently than is necessary to quench sensations of thirst.

(2) **Salt requirements:** When water is lost through perspiration, vital body salt is also lost. An ordinary diet contains enough salt to make up this loss when a person's water intake is less than 1 gallon a day. If daily water intake increases, the soldier should lightly salt his food from his field rations pack.

**NOTE:** First aid for heat injuries is found in FM 21-11.

##### b. Preventing cold injuries:

(1) Clothing for cold weather is designed to afford protection, insulation, and ventilation; protection by covering as large an area of the body as possible; insulation by trapping air which has been warmed by the body and holding it near the skin to prevent loss of heat from the body; ventilation by allowing a two-way exchange of air through the various layers of clothing. This exchange of air prevents overheating and excessive perspiring. Clothing should be worn in layers and loose enough to allow movement and exercise of hands, feet, and other parts of the body. The clothing should also be clean and dry.

(2) Good circulation should be maintained by exercising the feet and legs. This is especially important during rest breaks.

(3) It is advisable that troops in cold weather be paired as "buddies," each having the responsibility for reminding the other to take warming exercises at frequent intervals and to watch for signs of frostbite and trench foot. FM 21-11 gives signs and first aid for cold-weather injuries.

## REFERENCES:

FM 21-10, Field Hygiene and Sanitation, Jul 70 (chap 3, pages 14-19, chap 6, pages 37-42 and chap 17, pages 80-86)

FM 21-11, First Aid for Soldiers, Jun 76 (chap 9, para 9-8 and 9-9, pages 88-91)

TEC Lesson 929-441-0040-F, Care of Feet

TEC Lesson 929-441-0043F, Environment Hazards, Part 1: Treatment of Drinking Water

TEC Lesson 911-441-0034-F, Snake Bites and Hot Weather Hazards

TEC Lesson 911-441-0035-F, Cold Weather Hazards



## TASK NUMBER: 121-030-2501

## PREPARE THE RATER'S SECTION OF AN ENLISTED EVALUATION REPORT (EER)

### CONDITIONS:

Given DA Pamphlet 623-1, one blank DA Form 2166-5, and a No. 2 pencil.

### STANDARDS:

Complete parts II and III of the Enlisted Evaluation Report, DA Form 2166-5, as outlined in DA Pam 623-1 (Preparation of Enlisted Evaluation Reports).

### PERFORMANCE MEASURES:

1. Parts I and VII of the report will be completed by the Military Personnel officer (MILPO). **Parts II and III are completed by you as the rater, and by the indorser.** Part IV is completed by the indorser, and Part V is completed by the individual being rated.

**NOTE:** Part I should be checked by the rater and rated individual for possible discrepancies.

#### 2. Part II.

<b>A.</b>	<b>BRIEF DESCRIPTION OF DUTIES</b>	Soldier performs duty as rifleman in a mechanized rifle platoon. Disperses small arms fire toward enemy when required to do so.
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a. **Block A.** You will enter the actual duties performed by the rated soldier, including additional duties.

<b>B.</b>	<b>INDORSER HAS NOT OBSERVED AND CANNOT RATE SOLDIER</b>	<input type="checkbox"/>
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b. **Block B.** This block is not applicable to the rater. Will be completed by the indorser.

<b>C.</b>	<b>REPORT BASED ON:</b>	DAILY CONTACT	FREQ OBSN	INFREQ OBSN	REPT & REC
	R <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	I <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

c. **Block C.** Two selections are possible. Check the appropriate box to indicate frequency of contact, and, if applicable, also check reports and records. The rater will fill in the line following the "R" only.



f. **Block F. Demonstrated Overall Performance of Assigned Duties.** In this section, you rate the soldier's strengths and weaknesses, using overall performance. Any rating of ranks with very best or demonstrates major shortcomings will be cross-referenced and addressed in Block J (rater's section).

F. DEMONSTRATED OVERALL PERFORMANCE OF ASSIGNED DUTIES									
Ranks With Very Best	Superior to Most	Exceeds or Meets Duty Requirements	Demonstrates Shortcomings		SCORE				
			Minor	Major					
R <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	33				
44 43	42 38 34	33 27 21 15	14 10 6	5 3 1					
I <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>					

g. **Block G. Advancement Potential.** Rate the soldier on ability to perform in the next higher grade by considering total capacity in comparison with other individuals of the same grade and length of service. Any rating of promote immediately, not promote, or denied continued active duty will be cross-referenced and addressed in Block J (rater's section).

G. ADVANCEMENT POTENTIAL					
IF I HAD THE AUTHORITY AND RESPONSIBILITY TO DO SO, I WOULD: (DISREGARD TIME IN GRADE REQUIREMENTS)					
Promote Immediately	Promote Ahead of Peers	Promote With Peers	Not Promote	Deny Continued Active Duty	SCORE
R <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	18
31 30	28 26 24	22 18 14 10	7 5 3	0	
I <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	

h. **Block H. Score.** Enter the scores from the appropriate boxes from Blocks E, F and G and total them. The sum of the scores is added by the indorser.

H. SCORE	
BLOCKS	RATER INDORSER
E	<input type="text"/> 29 <input type="text"/>
F	<input type="text"/> 33 <input type="text"/>
G	<input type="text"/> 18 <input type="text"/>
SUM	<input type="text"/> 80 + <input type="text"/> - <input type="text"/> ÷ 2 = <input type="text"/> REPT SCORE

i. **Block I. Career Development.** Recommendations for logical career development, such as advanced schooling and special assignments, are required here.

<b>I. CAREER DEVELOPMENT (RECOMMENDATIONS ON SCHOOLING AND ASSIGNMENTS)</b>
Recommend DA NCO Development Course for individual.

j. **BLOCK J. COMMENTS.** Comments are required in this Block regardless of score. Comments must be either typed or neatly printed.

<b>J. I. COMMENTS ARE MANDATORY TO JUSTIFY RATINGS IN PART II AS FOLLOWS:</b>				
a. BLOCK E SCORE BELOW 10 OR OVER 40, BLOCK F SCORE BELOW 6 OR OVER 42, BLOCK G SCORE BELOW 10 OR OVER 22, OR BLOCK D IF SOLDIER DOES NOT SUPPORT ARMY'S EQUAL OPPORTUNITY PROGRAM. b. INDORSER WHO CHECKS BLOCK II B.				
<table border="1"> <tr> <td><b>RATER</b></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: center;">Comments mandatory</td> </tr> </table>	<b>RATER</b>		Comments mandatory	
<b>RATER</b>				
Comments mandatory				

3. **Part III.** This entry, except for signature, must be typed or printed in black ink. Use black ink for signature.

<b>PART III RATER AUTHENTICATION</b>		
<b>A. ORGANIZATION AND DUTY ASSIGNMENT</b>	<b>B. NAME AND GRADE</b>	<b>C. DATE</b>
Co C, 1st Bn, 26th Inf APO NY 09039	Sqd Ldr CHARLIE A. DELTA E-6	5 Jan 76
<b>D. SIGNATURE</b>		
Charlie A. Delta		

4. **Counseling.** After signing the report, you should discuss the report with the rated soldier and counsel him. After counseling, you will forward the report to the indorser.

5. See figure 1 for a completed example of a Enlisted Evaluation Report, DA Form 2166-5, as filled in by the RATER.



[illegible]

**Figure 1.**

## 2-VII-A-4.5



**TASK NUMBER: 874-896-2001**

---

**CONDUCT A PERFORMANCE-ORIENTED  
TRAINING SESSION**

---

**CONDITIONS:**

Given:

1. A training objective with the following characteristics:
  - a. It must be an **individual** training objective.
  - b. It must not require the mastery of any intermediate training objective.
  - c. It must be teachable within 30 minutes and judged by an individual (your evaluator/supervisor) who has demonstrated mastery of the training objective.
2. No more than 24 hours to prepare the training session.
3. No more than 10 and no less than 4 trainees who are unable to perform the training objective.
4. All other necessary resources to conduct the training (for example, training aids, an area to conduct the training, etc.).

**STANDARDS:**

1. The trainer must conduct the training in three phases.
  - a. In Phase I, he must:
    - (1) Explain the training objective.
    - (2) Insure that trainees understand the training objective.
    - (3) Give appropriate instruction (e.g., demonstration, talk thru) to prepare the trainees to perform the training objective.
  - b. In Phase II, he must give the trainees sufficient time to practice performing and make necessary corrections.
  - c. In Phase III, he must test the trainee's ability to perform the training objective.
2. All trainees who cannot perform the training objective at the conclusion of the training session must be identified.
3. The reason(s) for the failure(s) must be identified.

## **PERFORMANCE MEASURES:**

1. Insure that you clearly understand the training objective which you are to teach. If you have questions, ask your evaluator/supervisor.

a. During Phase I, you inform the trainees. This includes explaining the training objective, insuring understanding, and a demonstration. (You may decide to talk the trainees through the task instead of first demonstrating it.) Explanation of the training objective must include the task which the trainees perform at the end of the session, the conditions under which they must operate (for example, equipment given or denied and terrain), and the standard they must achieve. Estimate the time it will take to complete Phase I.

b. In Phase II, you allow the trainees to practice performing the training objective. (Do not estimate the amount of time required for this phase at this time.)

c. In Phase III, you test the trainees to determine if each one can perform the training objective. Estimate the time that it will take to test all trainees. All remaining time will be allocated to Phase II of the training session. If you properly organize available time, all trainees should be able to accomplish the training objective within the time estimated.

2. Obtain any training aids that you need. (You may find it helpful to look in appendix C, FM 21-6, Training Techniques, Aids, and Devices.) If the training objective which you have been given is contained in the Skill Level 1 Soldier's Manual, look at the "performance measures" portion of the task summary for your particular training objective. This should also give you some helpful information.

3. Rehearse the training session.

4. Conduct the training session (in three phases as described above).

5. Evaluate the results of the training session. Remember that all trainees must perform the training objective and that it is critical to identify those who cannot. Note the reason(s) for any failure(s). Reasons for failure might be: insufficient resources (time, training aids, etc.); unrealistic standards, or lack of trainee motivation.

## **REFERENCES:**

**FM 21-6, How to Prepare and Conduct Military Training, Nov 75 (chap 3, pages 8 thru 26)**

**TEC Lesson 901-071-0091-F, Unit Development and Training, Part 1**

**TEC Lesson 901-071-0092-F, Unit Development and Training, Part 2**

**TASK NUMBER: 874-896-3001**

---

**PREPARE AND CONDUCT A PERFORMANCE-ORIENTED  
TRAINING SESSION (INDIVIDUAL AND COLLECTIVE)**

---

**CONDITIONS:**

Given complete commander's guidance for preparation and conduct of a specific training session (individual or collective); an ARTEP applicable to your unit; Soldier's Manuals for the MOSs of your subordinates; FM 21-6; and access to your unit's training aids and devices, TEC equipment, and training facilities/areas.

**STANDARDS:**

Within the time and resource limits given in the commander's guidance, conduct the training session so that each individual or element(s) can perform to the standards specified and under the conditions listed in the commander's training objective.

**PERFORMANCE MEASURES:**

1. **Overview.** The preparation and conduct of performance-oriented training (be it individual or collective, equipment or tactically oriented) consists of the three-step backward planning process:

- a. Describe the desired results of training.
- b. Prepare to conduct training.
  - (1) Establish intermediate training objectives.
  - (2) Determine and organize training required.
- c. Conduct training to standards.

A more detailed discussion of these three steps is outlined below.

2. **Describe the desired results of training.** If you are given complete guidance by your commander, this step is done for you; if not, you will have to complete it so that it is satisfactory to your commander. To be complete, it must include the following:

a. **WHAT SPECIFIC TRAINING OBJECTIVE DO YOU WANT ACCOMPLISHED?** The training objective should include the task that the soldiers must be able to perform, the conditions under which the soldiers must perform the task, and the training standard which specifies the proficiency the soldiers must attain.

- b. TO WHOM WILL THE TRAINING BE GIVEN? (e.g., 2 squads.)
- c. WHEN WILL THE TRAINING TAKE PLACE? (e.g., 1300-1700 hours, 25 September, 3 weeks from now.)
- d. WHERE WILL THE TRAINING TAKE PLACE? (e.g., Training Area K.)
- e. WHY THE COMMANDER DECIDED TO CONDUCT THE TRAINING. What were his reasons for his decision?

3. **Prepare to conduct training.** This step is usually the most time consuming and difficult of the three steps. Do not take it lightly; however, if done properly it will insure the success of your training effort. It consists of the following:

#### PREPARE TO CONDUCT TRAINING

*Establish Intermediate Training Objectives by:*

Developing tasks required to accomplish the commander's training objective.

Establishing the conditions under which each task must be accomplished.

Establishing a training standard of performance for each task.

*Determine and Organize Training Required by:*

Determining which intermediate training

objectives the soldiers cannot successfully perform without further training.

Organizing the intermediate training objectives into a progressive sequence (simple to complex) consistent with the available resources.

Estimating the training resources, trainer techniques, aids and devices needed to accomplish each objective.

Completing administrative requirements (e.g., obtaining equipment, writing the lesson plan, rehearsing training, etc.).

There are several references and aids which can assist you in accomplishing this step.

- a. **FM 21-6, How to Prepare and Conduct Military Training**, provides detailed discussion on the preparation and conduct of training.
- b. **The ARTEP** for your unit lists training objectives for most of the collective tasks you will be concerned with.
- c. **Soldier's Manuals** list training objectives and intermediate training objectives for individuals for most of the training (both individual and collective) you will encounter. In addition they provide training tips which can assist you in your preparation.
- d. **Training Extension Courses (TEC)** lessons develop (or will in the future) most of your intermediate training objectives into pre-packaged lessons. In some cases they are hands-on. In others, you must complete the training by providing the performance practice and evaluation. In addition, the pretest for each lesson can help you identify which intermediate training objectives require (or do not require) training.

**4. Conduct training to standards.** The basics of the conduct of training are presented in the **TASK: Conduct a performance-oriented training session**. In some cases, when collective training is involved, you will find the use of multi-echelon training to be an efficient method of training. Despite the different name, the basics still apply. You might require assistant trainers (other squad leaders, for example) but the process of conducting training remains the same:

- a. Explain and demonstrate.
- b. Soldiers/teams/squad practice.
- c. Test.

Remember: the key to success is a good training objective.

#### **REFERENCES:**

**FM 21-6, How to Prepare and Conduct Military Training, Nov 75**  
**(chap 6, pages 51-70, 76)**  
**TEC Lessons 901-071-0091-F through 0097-F**





**CHAPTER 2**

**HEAVY ANTIARMOR INFANTRYMAN**

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**SECTION VIII**  
**TACTICS**

---

**TASK SUMMARIES**



---

**OCCUPY A TOW FIRING POSITION**

---

**CONDITIONS:**

As a squad leader, given a squad sector of fire, the general location of a firing position, and a vehicle-mounted TOW weapon system.

**STANDARDS:**

The position occupied must, as a minimum:

1. Cover sector of fire.
2. Use natural cover and concealment.
3. Avoid conspicuous terrain features.

**PERFORMANCE MEASURES:**

1. Approach the general location of a firing position from the rear or flank. Stop the vehicle short of the location in a covered and concealed position, dismount, and reconnoiter the general location for the exact firing position.

a. Always attempt to find a mounted firing position. This increases the flexibility of the squad by using the minimum amount of time in displacing to new positions.

b. It may be necessary to dismount the TOW and carry it to the firing position if the terrain prevents the vehicle from moving to the position or if the vehicle cannot be concealed.

2. An ideal TOW position would be one that allows for a flank engagement, offers concealment of the flash and weapon signature, has the weapon defiladed from the direction of approaching OPFOR vehicles, and offers concealment to the front. You should strive for a flank engagement (especially at ranges of 1,500 — 2,000 meters where OPFOR tank guns have a better than 50/50 change of a first-round hit).

a. An advancing tank's firepower and observation are generally oriented to the front, making it difficult to detect and retrace a TOW launched from its flank.

b. Armorplating on the sides of an OPFOR tank is thinner, which will help insure a kill. You should strive to find a position that will conceal the flash and signature because a tank trailing the one fired on may sight your launch signature and fire on your position.

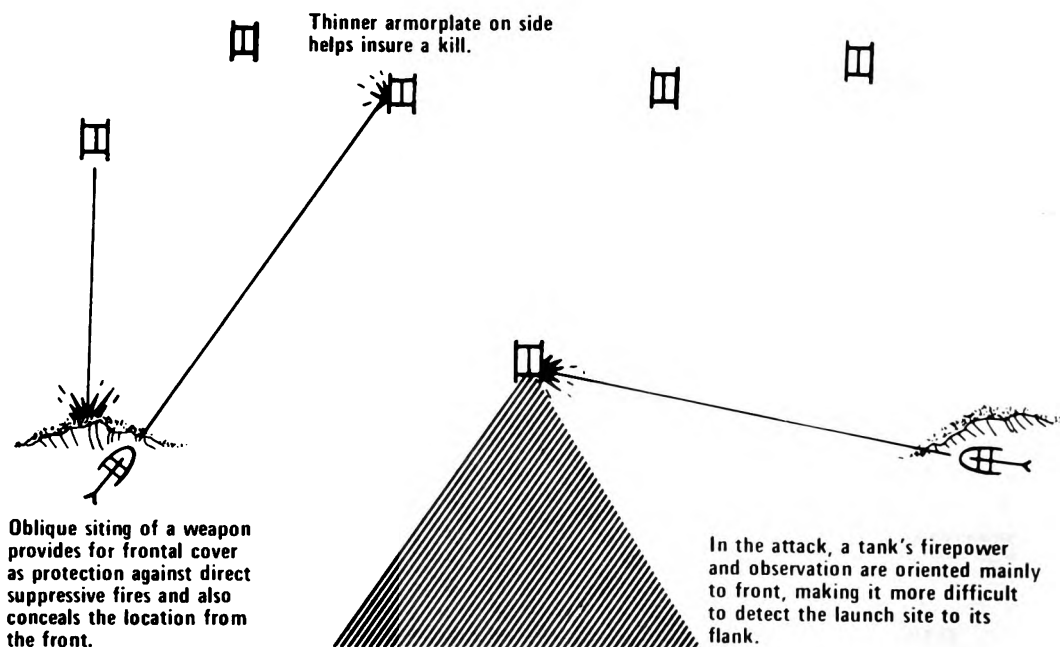


Figure 1. Tow positioning.

3. The position occupied must:

a. **Covers the sector of the fire.** Covering the squad sector of fire means that you can see and engage targets in it while avoiding detection yourself. The position selected should be one that has the best shot into the assigned sector of fire (preferably a flank shot). If you have been assigned a sector of fire where there is no position available to see and engage targets, notify your section sergeant immediately. If you have deadspace in your sector of fire, insure your section sergeant is aware of this so he can arrange the section to best cover the assigned section sector of fire, and so he can designate primary and alternate positions.

b. **Uses natural cover and concealment.**

(1) Virtually every piece of terrain has features that can enhance or degrade mission accomplishment with the TOW. Some terrain features that will serve to maximize the chances for success of the TOW and minimize its vulnerability due to detection are:

- (a) The military crest of hills (not near good reference points).

(b) The reverse slope of hills to fire at the rear or flank of OPFOR vehicles.

(c) The edge of a woodline.

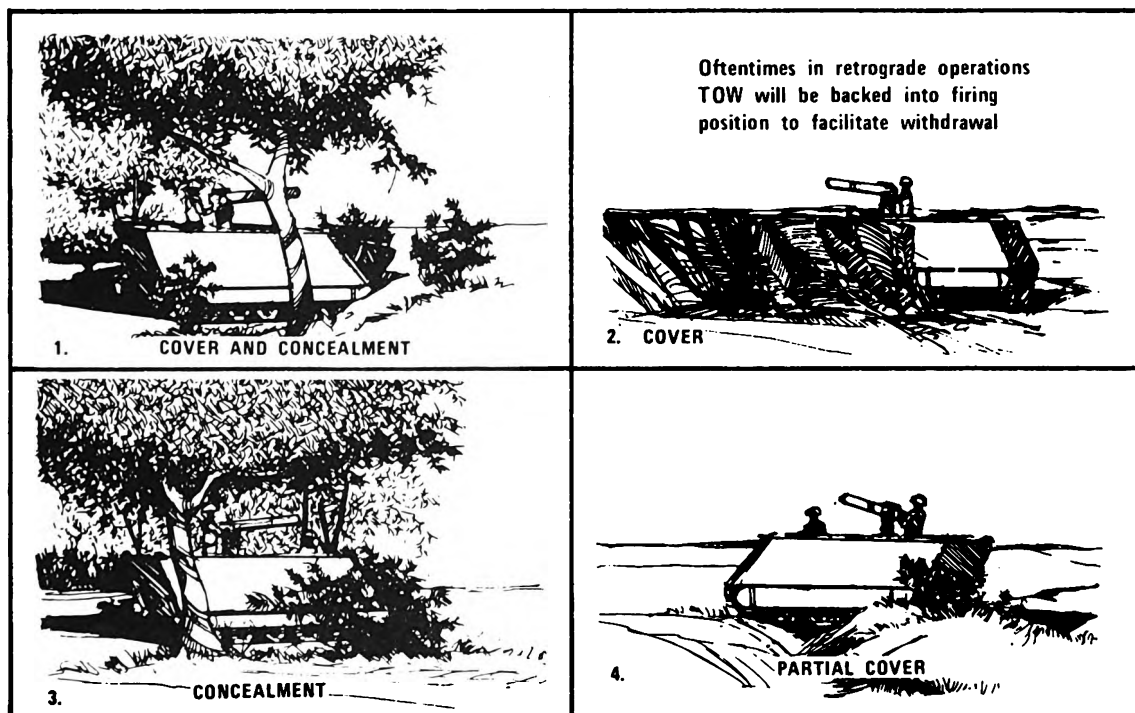
(2) Use the terrain to your advantage for cover from enemy fire and for concealment from enemy ground and aerial observation. Since perfect cover and concealment will not always be available, priorities must be established. The terrain characteristics you must look for in picking a position are (in the order of their desirability):

(a) Cover and concealment.

(b) Cover.

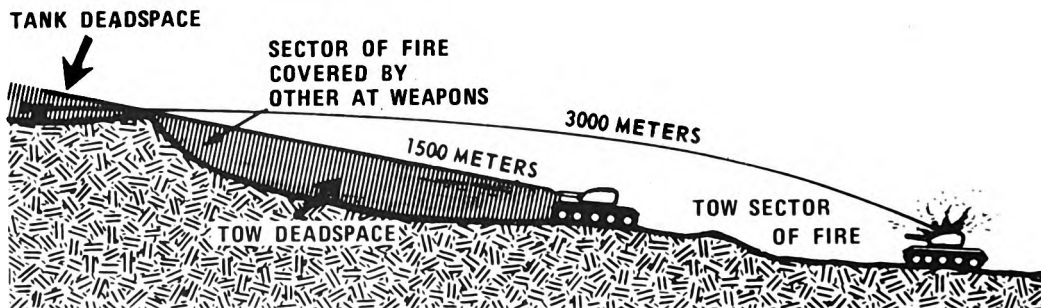
(c) Concealment.

**NOTE: Concealment of the flash and signature is an overall essential factor.**



*Figure 2. TOW positions using cover and concealment*

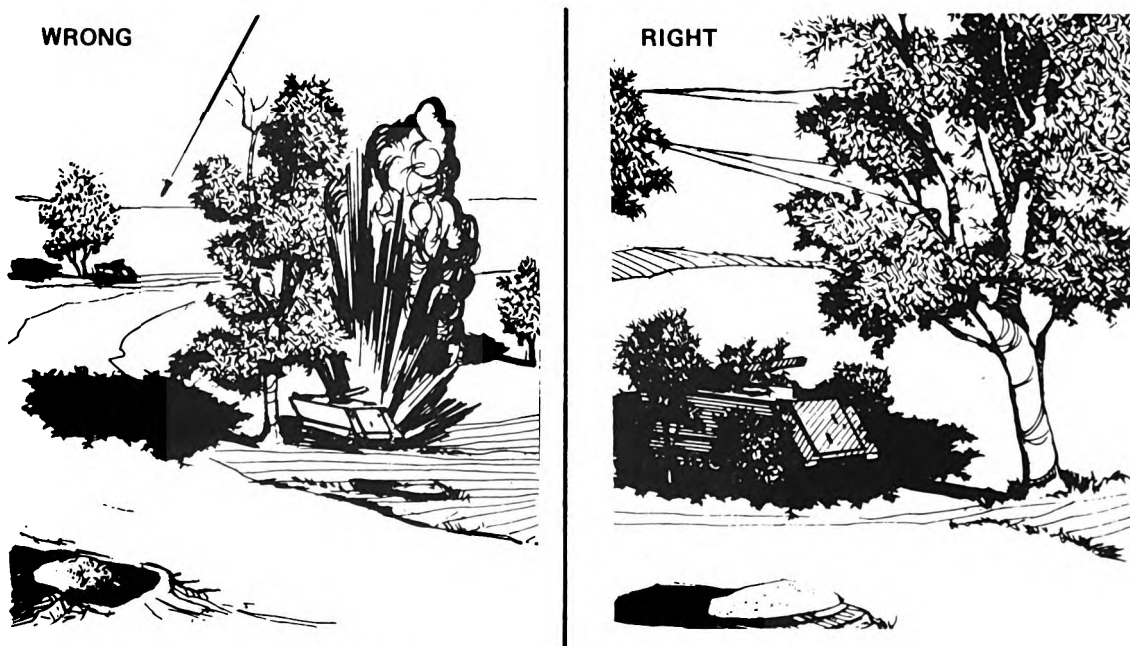
(3) When analyzing the terrain in your sector, consider the proper use of high ground. This can gain your crew protection and optimize TOW standoff. In figure 3, the TOW has been positioned far enough back on the high ground so it can cover its sector of fire, yet be protected from tank fire closer than 1,500 meters because of deadspace.



*Figure 3. Use of high ground.*

(4) At times, you may have to use shadows for concealment (figure 4). When this happens, vehicles must be moved as the shadows shift. If a vehicle is located under a tree, and the shadows and foliage do not give enough concealment from the air, the vehicle should be camouflaged with branches.

**NOTE:** The range card must reflect the change in vehicle position because of the shift of the vehicle position when the shadows move.



*Figure 4. Use of Shadows.*

c. *Avoids conspicuous terrain features.* Avoid road junctions, hilltops, lone buildings or trees, or other obvious positions. These attract the enemy's attention, and his artillery will probably have registered on them.



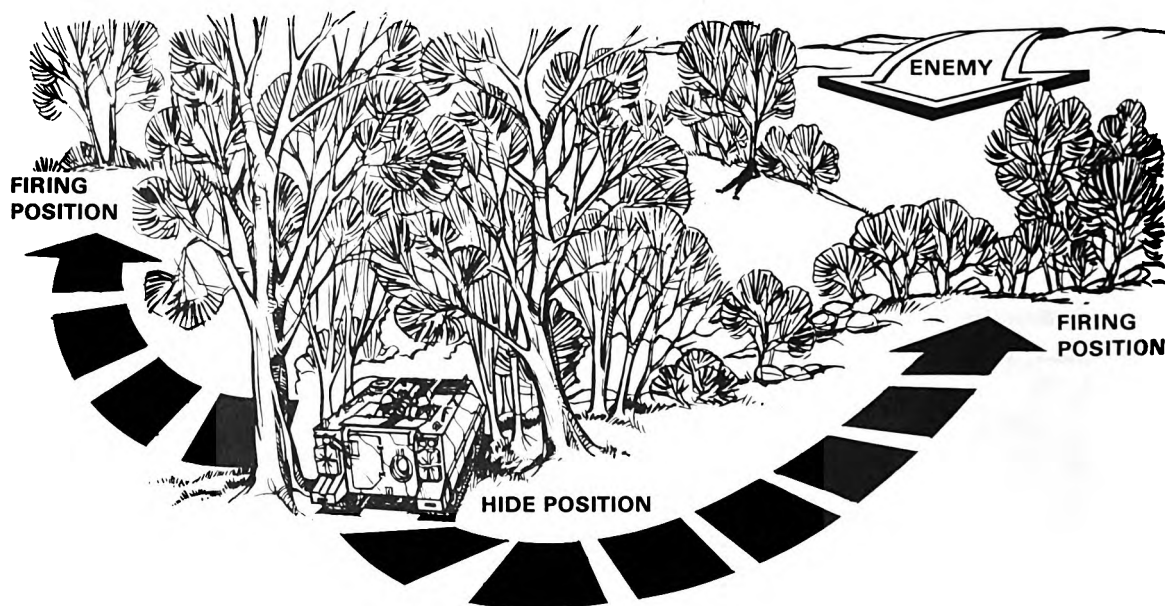
*Figure 5. Incorrect TOW positioning.*

**NOTE:** You must have communication with the section leader or whoever is controlling your fire. Therefore, the position must allow for radio communication, wire communication, or visual communication. Perferably, the position will allow for a combination of these so one can be used as a backup.

4. Once you determine the exact location of the firing position, select a concealed route to it and call the vehicle forward and guide it into position.

5. If you determine there is no position within your sector that has natural concealment from enemy ground or aerial observation, and/or you determine it is not practical to camouflage the position with artificial materials, the weapon should be positioned in a nearby covered and concealed location, i.e., a hide position. The weapon should remain there until it actually engages targets from its primary or supplementary firing positions. When the weapon is located in a hide position, an observer from the squad remains at the firing position; when targets appear, he calls the TOW forward and points out the target to the gunner. The observer must

have binoculars, as well as communication with the crew. If the observer does not have visual contact with the crew, then a field telephone should be installed between them.



*Figure 6. The hide position.*

**REFERENCES:**

NONE



**TASK NUMBER: 071-316-2552**

---

**CONTROL TOW SQUAD FIRES**

---

**CONDITIONS:**

Given a TOW weapon system with crew and a sector of fire, prepare to engage targets moving into your sector.

**STANDARDS:**

1. Explain methods of fire control, to your squad so, as a minimum, they will understand:

- a. Engagement priorities.
- b. Sectors of fire.
- c. Target reference points (TRP).
- d. Phaselines.
- e. Fire patterns.
- f. Fire commands.

2. Given fire commands so that the crew knows what target(s) is to be engaged. Fire commands will include:

- a. Alert.
- b. Target identification/target location.
- c. Method of engagement.
- d. Execution.
- e. Closing.

**PERFORMANCE MEASURES:**

1. **Responsibilities.** Upon receipt of mission:

- a. Coordinate for mutual support with any adjacent antitank weapons and integrate the security of the crew with any nearby units.
- b. Supervise preparation of fighting positions.
- c. Supervise the preparation of range cards.
- d. Brief crew members on fire control measures.

## **2. Fire control methods.**

a. Fire control measures are normally established by the platoon leader or company commander and are designed to take advantage of the TOW's range, accuracy, and destructive power by equally distributing TOW fires across the battle area. Effective fire control and distribution measures will:

- (1) Prevent firing more than one missile at the same target.
- (2) Avoid needlessly revealing TOW locations.
- (3) Insure complete coverage of all armor avenues of approach.
- (4) Enable TOWs to fire first.
- (5) Provide for destruction of most important targets first.
- (6) Gain the best shot at a target.
- (7) Afford the leader the ability to better control TOW fires.

### **b. The fire control measures area:**

(1) **Priority of engagement.** Under certain circumstances, a priority of engagement by type of vehicle may be assigned. For example, if enemy air defense weapons are preventing the Air Force or attack helicopters from operating in the forward battle area, destruction of enemy air defense weapons may be given a priority; if enemy carrier-mounted ATGMs are reducing effective employment of tanks, they may be designated as priority targets. When a target(s) is assigned an engagement priority, that target is engaged first when it appears. Other targets are engaged after the priority target(s) has been destroyed. Priority of engagement can be used as a fail-safe measure if radio communication is lost or jammed. Engagement priorities can prevent multiple engagements of one target when:

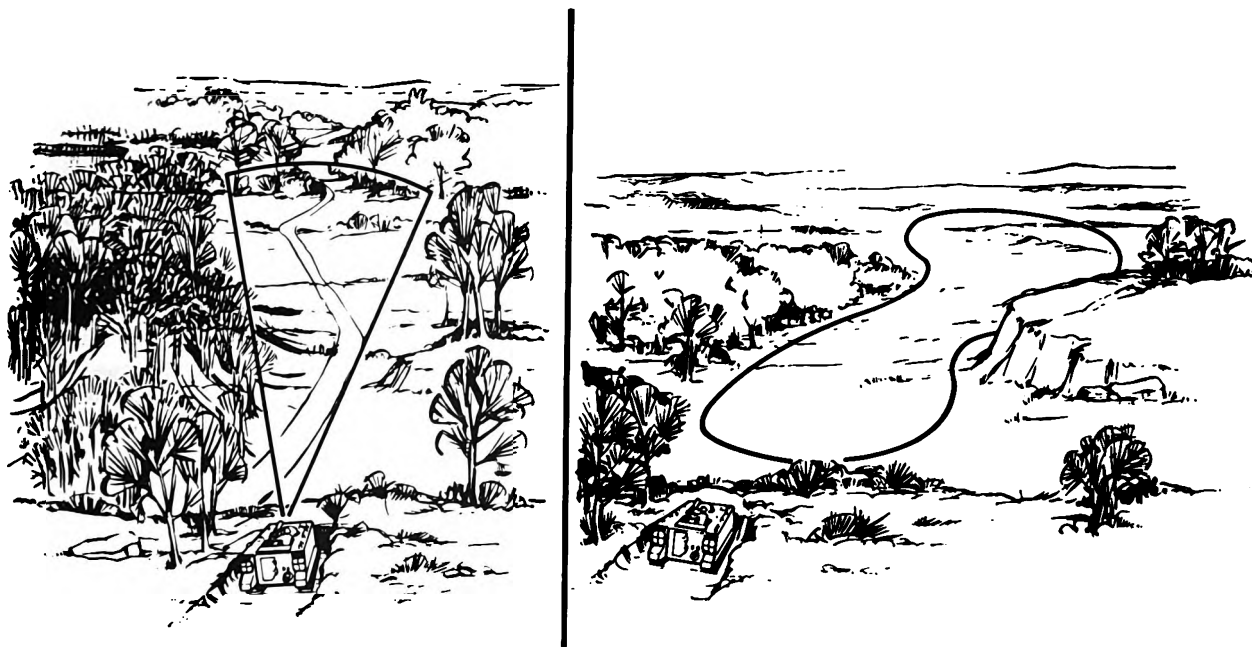
- (a) Sectors of fire have not been assigned.
- (b) Overlapping sectors of fire have been assigned.
- (c) More than one section is covering a main avenue of approach.

In the absence of assigned engagement priorities, you should establish priorities to destroy those targets that:

- are the greatest threat to accomplishment of your mission first.
- will break up the momentum of the attack by destroying the command and control element.

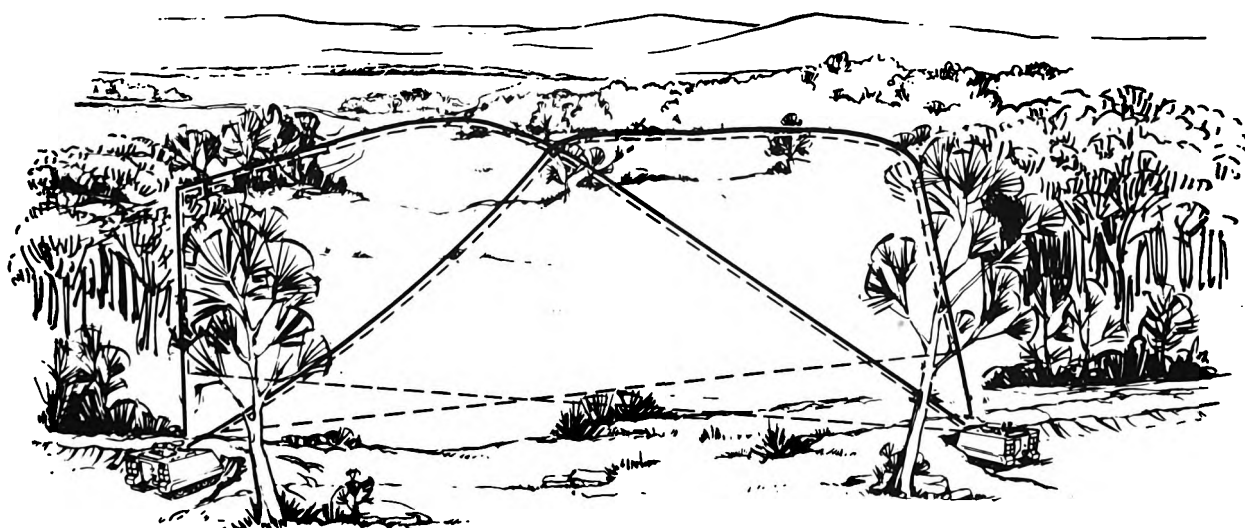
(2) **Sectors of fire.** A sector of fire is the area you will be assigned to cover with your TOW squad. Sectors are assigned to insure that fires are adequately distributed throughout the battle area, to insure that all armor avenues of approach are covered, and to facilitate the massing of fires. They are normally designated by natural terrain features, whenever possible, for

ease of identification. Frequently, sectors of fire are shown as being fan-shaped areas; however, a sector of fire may be any shape (figure 1).



*Figure 1.*

(a) When a TOW squad is assigned a primary sector of fire, it is also assigned a secondary sector of fire. When the terrain permits, the primary sector of one squad is the secondary sector of another squad. This provides for mutual support between squads and permits massing of fires in either sector (figure 2).



*Figure 2.*

(b) Occasionally, a TOW squad will be assigned a sector of fire that overlaps another squad's sector. This is done to concentrate TOW fires in a critical area or to gain a flanking shot. The leader or commander will coordinate the two squads' fires or designate the leader in the most favorable position as responsible for fire coordination in the sector (figure 3).



Figure 3.

(c) If your squad is assigned a sector that it cannot cover, you must report this immediately to your leader or commander.

**3. Target reference points.** A TRP is a prominent natural or manmade feature, such as a road intersection, hill, or bridge, designated by the commander to rapidly designate targets and control direct fires. TRPs are normally designated by a letter or number (or a combination) and are recorded on range cards for easy reference (figure 4).

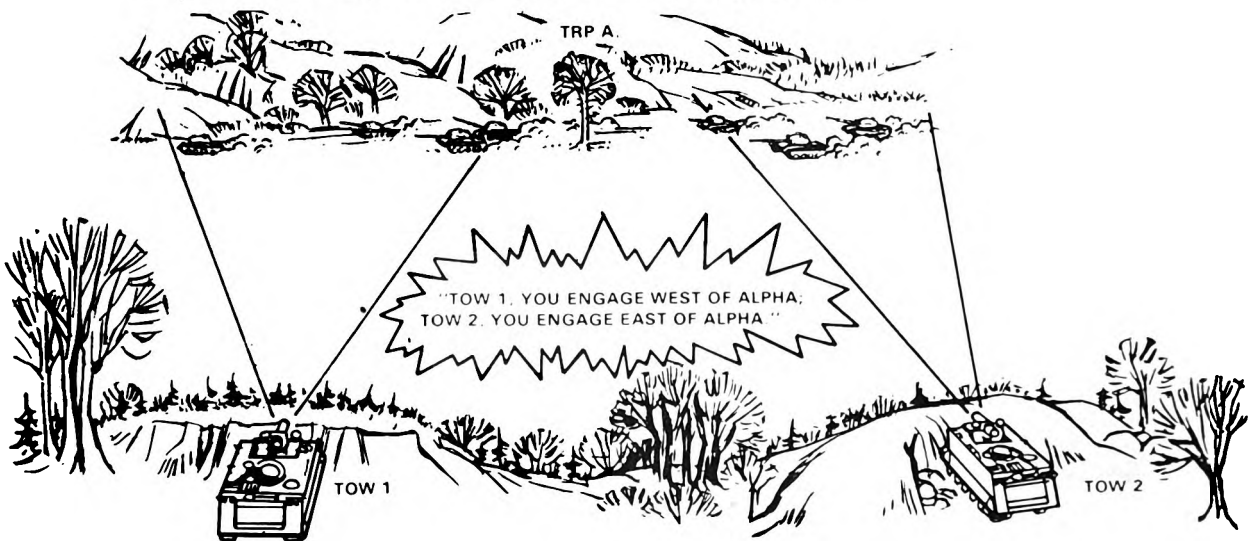
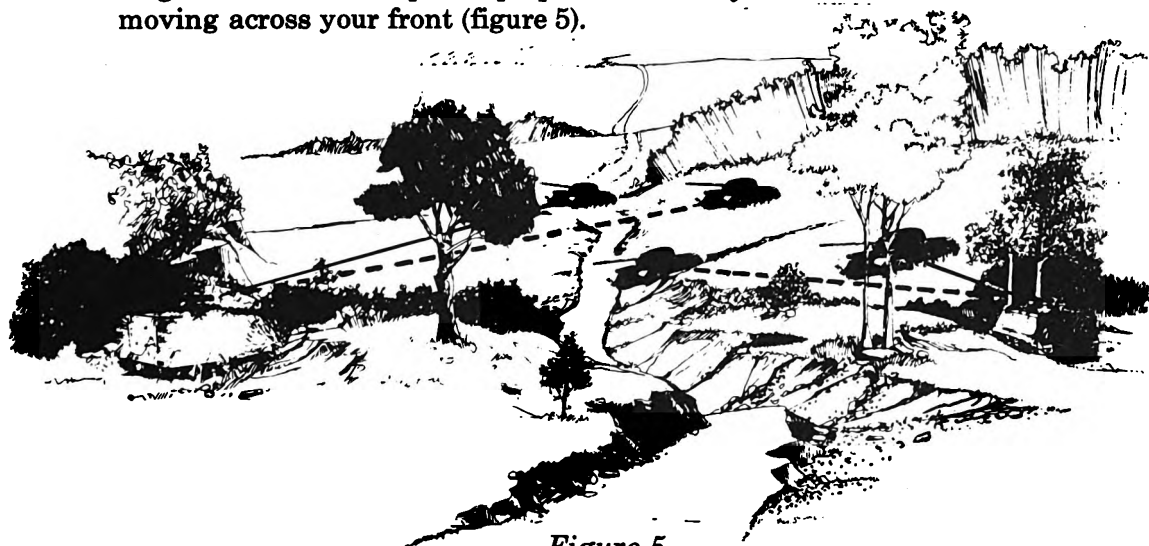


Figure 4.

**NOTE:** Direction from TRPs is given in cardinal directions (north, south, etc.) rather than left or right. However, when you (squad leader) are giving fire commands to your squad and are in the same location as the squad, you can use left or right for ease of understanding and rapid target engagement.

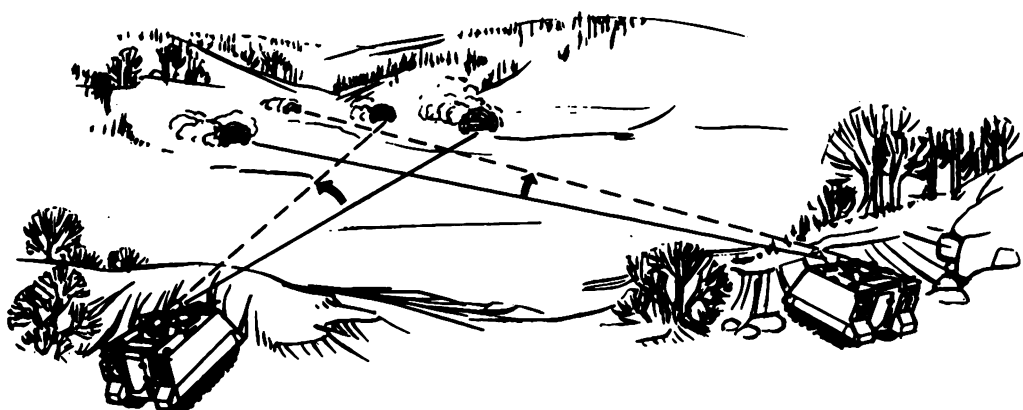
**4. Fire patterns.** Fire patterns are used to control section fires against an armored formation. Three basic fire patterns will cover most situations and provide fast, effective fire distribution when multiple targets appear. The basic idea is to have each TOW squad start at opposite ends of a formation and work toward the center to prevent multiple engagements of one target.

**a. Frontal Fire Pattern.** The frontal fire pattern is best used when a target formation is spread perpendicular to your direction of fire and moving across your front (figure 5).



*Figure 5.*

**b. Crossfire Pattern.** The crossfire pattern is best used when a target formation is spread perpendicular to your direction of fire and moving toward your position. In addition to distributing section fires, it also enables you to achieve a flank engagement and deceive the enemy (figure 6).



*Figure 6.*

c. **Depth Fire Pattern.** The depth fire pattern is best used when targets are exposed in depth. One TOW squad engages the far targets; both squads then fire toward the center of the formation. Determination of which squad fires at what target will be made by the leader responsible for controlling the fires (figure 7).

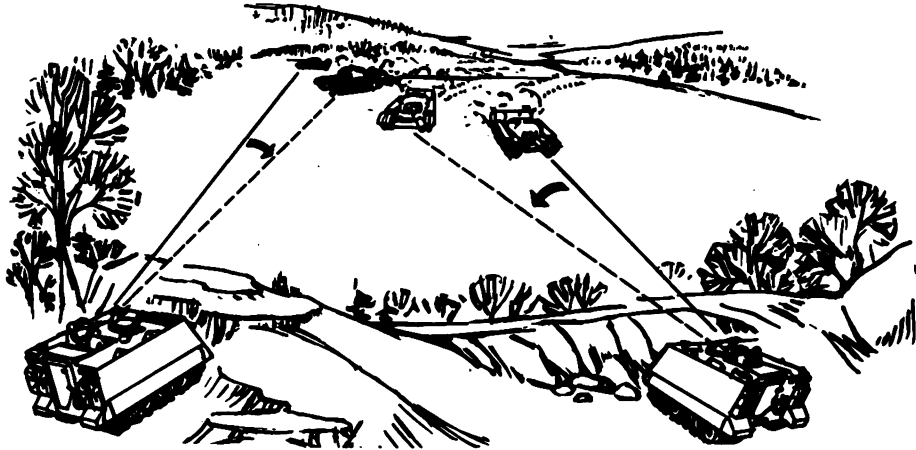


Figure 7.

5. **Fire commands.** The use of a standard fire command insures that the correct target will be engaged as rapidly as possible. It also minimizes radio transmission time. Fire commands should be as short as possible. The fire elements of the standard fire command format should be used.

<b>ALERT</b>	<b>Warns the squad of a fire mission.</b>
<b>TARGET IDENTIFICATION/ TARGET LOCATION</b>	<b>A brief description of the target. Squad leader tells the gunner where to look for the target by giving:</b> (1) <b>direction and distance from the TOW.</b> (2) <b>direction and distance from a terrain feature or TRP. (Squad leader uses cardinal directions in squad fire commands.)</b>
<b>METHOD OF ENGAGEMENT</b>	<b>Used only when the gunner is faced with multiple targets, i.e., frontal, depth, or crossfire.</b>
<b>EXECUTION</b>	<b>The command "FIRE" or "AT MY COMMAND, FIRE." The first indicates that the gunner is to engage the target as soon as he acquires and begins to track it.</b>

The second command is given in two parts and allows the leader to determine the moment of firing. This allows the leader to maintain the element of surprise and allows for the massing of TOW fires.

## **CLOSING**

**"CEASE TRACKING" or "CEASE TRACKING, OUT OF ACTION"** will be issued after observing the warhead detonate or when the squad leader desires to halt firing for any reason.

**"CEASE TRACKING"** notifies the crew that the squad leader intends to remain in position and engage another target immediately or when one appears.

**"CEASE TRACKING, OUT OF ACTION"** notifies the crew that the squad leader intends to move to another position.

When the section leader is calling a fire mission to your squad over wire or radio, the establishment of communications is a sufficient alert.

## **REFERENCES:**

**TEC Lesson 948-071-0023-F, TOW Fire Commands**





## TASK NUMBER: 071-326-3001

---

**SELECT EXACT TERRAIN ROUTE FOR A TRACKED VEHICLE AND DIRECT THE DRIVER OVER THE ROUTE**

---

**CONDITIONS:**

In a field environment, given a tracked vehicle, driver, map, enemy situation, and a mission to move from one point to another.

**STANDARDS:**

Select the best route from one point to another and direct the movement of the tracked vehicle over this route IAW the considerations described in the performance measures.

**PERFORMANCE MEASURES:**

1. The vehicle commander should give the driver clear, specific instructions as to the route which afford the best use of available cover and concealment (figure 1).

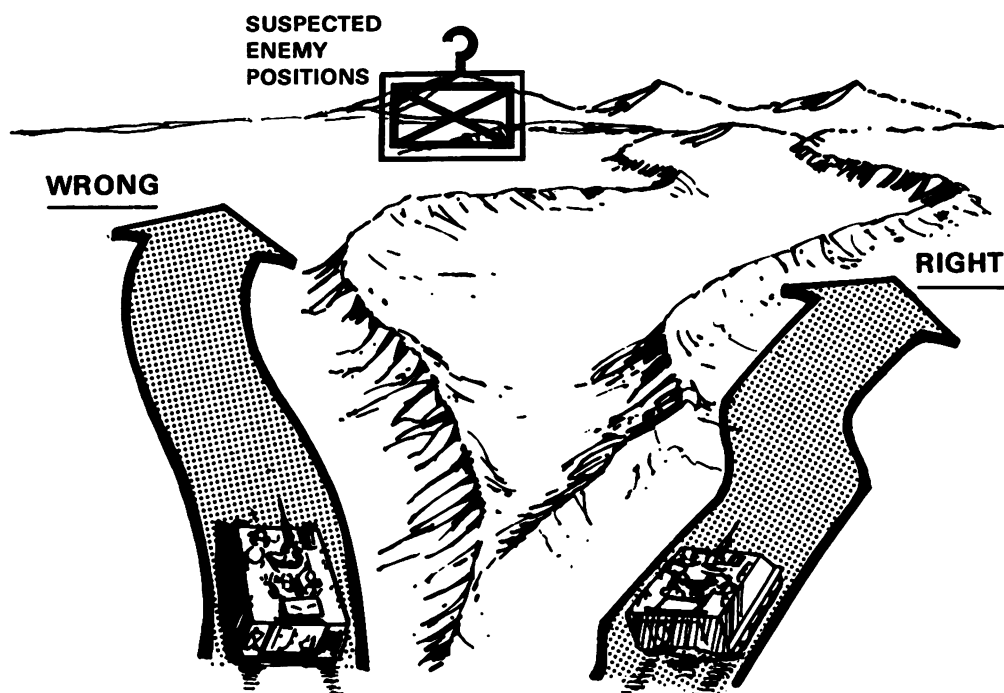


Figure 1.

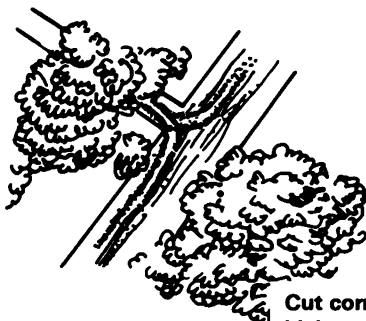
2-VIII-A-4.1



- c. Use all available cover and concealment.
- d. Try to leave the terrain looking as natural as possible to make tracking by the enemy harder.

### ● DON'T CUT CORNERS SHORT

THIS . . .



Cut corners show vehicle movement into woods.

. . . NOT THIS



### ● USE TERRAIN TO HIDE TRACKS

THIS . . .



Vehicle moves along single track using terrain to hide movement.

. . . NOT THIS



Vehicle track across plowed field open area.

*Figure 4.*

e. If you must cross an open area, check it first then, **CROSS IT QUICKLY**. When you must cross an open area (emerge from a woodline, cross a ridge, etc.), carefully check out the area for possible enemy positions before you emerge from cover (figure 5). If enemy locations are identified or suspected, suppress or smoke them prior to crossing. **CROSS THE OPEN AREA AS RAPIDLY AS POSSIBLE FROM COVERED POSITION TO COVERED POSITION**. (If you are exposed for less than 30 seconds, it will be extremely difficult for an enemy ATGM gunner to acquire, fire, track, and hit you at a long range.)

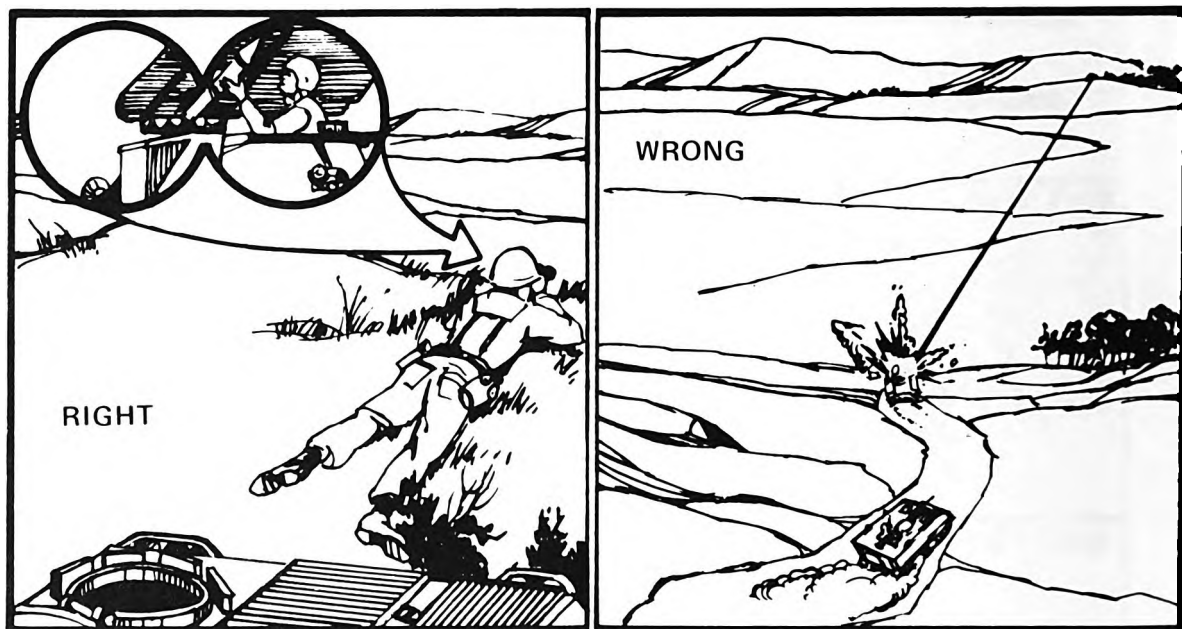


Figure 5.

f. Where covered or concealed routes are not available or when their use would be too time-consuming, plan routes that have “escape valves” available (figure 6).

**EXAMPLE:**

**Here, a dense tree line provides protection from Sappers.**

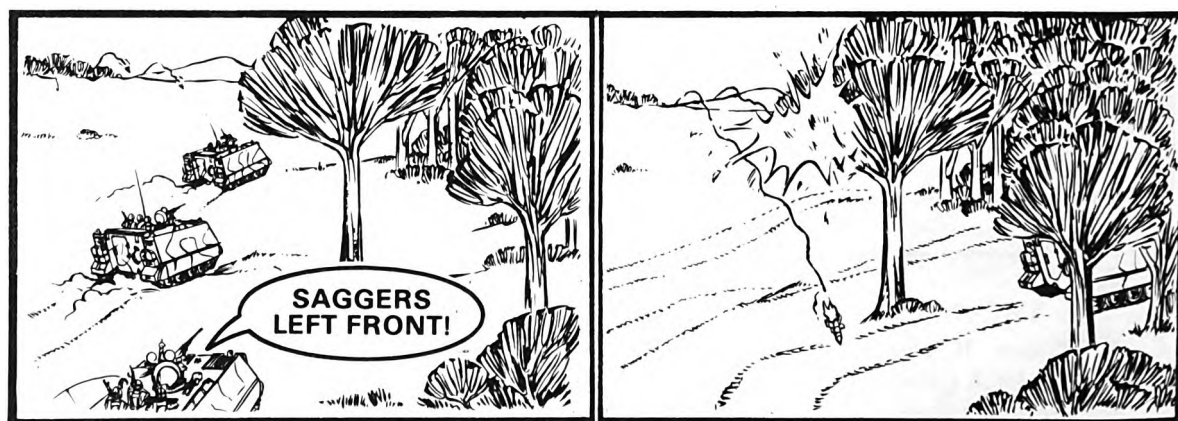


Figure 6.

**REFERENCES:**

**FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (chap 3, pages 3-11 thru 3-14)**

2-VIII-A-4.4

**TASK NUMBER: 071-326-3002**

---

**REACT TO INDIRECT FIRE WHILE MOUNTED**

---

**CONDITIONS:**

In a field environment, day or night, when subjected to artillery or mortar fire while mounted in a tracked vehicle.

**STANDARDS:**

1. Immediately close all hatches.
2. Report the fire to the section/platoon leader.
3. Depending on the mission, move rapidly through or around the impact area.

**PERFORMANCE MEASURES:**

1. Use training aids such as grenade/artillery simulators and demolition pits to add realism to training.
2. When training a mounted unit to react to indirect fire, move the vehicle through an area and simulate indirect fire without warning.
3. As team/squad leader, always maintain control of your vehicle by moving into cupola and observing through vision blocks, be sure all track hatches are closed, and move rapidly through the impact area. (Establish an SOP, and then practice it while training.)

**REFERENCES:**

None



**TASK NUMBER: 071-316-2555**

---

**REACT TO DIRECT FIRE WHILE MOUNTED  
(TOW/ITV)**

---

**CONDITIONS:**

As squad leader of a TOW squad (M113A1), M901, M151, M274 units) conducting a mounted movement, given direct fire from an enemy position(s).

**STANDARDS**

Return fire immediately, direct the driver to move to the nearest covered position, report the contact to your section leader, and follow his instructions.

**PERFORMANCE MEASURES:**

1. The following actions are shown in order of priority, but they should be accomplished simultaneously upon contact. This response can be developed through the development of teamwork within your squad. With proper training, the squad will respond as a unit; i.e. return fire with the vehicle-mounted machine-gun or individual weapons while the driver seeks and occupies a covered position without your guidance. This teamwork will permit you to report immediately and initiate subsequent action quickly. In some instances, this teamwork will give you the flexibility to react independently and avoid costly delays.

2. The most critical action taken upon receiving direct fire is to return fire with all available weapons. The vehicle-mounted machinegun plays the primary role in this effort to suppress the enemy's fire, but the added firepower of any weapons being employed must not be overlooked. If there is no vehicle-mounted machinegun, all available squad members should return fire. This massive response is crucial in order to allow subsequent actions.



A moving TOW squad comes under direct Sagger fire. It immediately returns fire with the .50 cal machinegun and seeks cover to engage target with the TOW.

*Figure 1*

3. As suppressive fire is initiated, you must concern yourself with locating a covered position. If you have taken advantage of the terrain during the movement, the difficulty of this task will be minimized.

4. Upon receiving any fire, you should contact the section leader and advise him of the situation. Once this is done, he can develop the situation or provide you with the support you will need if you are pinned down or in contact with a force you cannot handle alone.

#### REFERENCES:

FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (chap 4, pages 4-21, 4-22)



**TASK NUMBER: 071-326-0601**

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**USE VISUAL SIGNALS TO CONTROL MOVEMENT  
(MOUNTED)**

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**CONDITIONS:**

Given a combat or field training situation with necessary flags or flashlights and you are moving mounted. Radio communications may or may not be available and radio silence may or may not be imposed.

**STANDARDS:**

1. Demonstrate the correct procedure for each signal in the performance measures below.
- 2. Train each member of your squad to recognize each signal and require them to take the appropriate actions.

**PERFORMANCE MEASURES:**

1. Visual communication is a means available to all units. Visual signals are transmitted by flags, lights, pyrotechnics, panels, arm-and-hand signals, and other prearranged methods. They are suitable for transmitting prearranged messages rapidly over short distances as well as for recognition and identification of friendly forces.

2. Visual signals also facilitate ease in controlling the action(s) or movement(s) of the follower and conversely visual signals can influence the action(s) or movement(s) of the leader.

3. It is important that you familiarize yourself with all the visual signals used on the battlefield. However, it is more important that you know those signals which can assist you in performing your specific job effectively in the event alternate means of communication are not available.

4. Signals for combat formations and battle drill:

a. These signals may be used, as appropriate, by either mounted or dismounted troops. They give the soldier a means of communication between himself and other persons or units. They must be practiced until their use becomes second nature. Signals must be given correctly and distinctly.

b. When a movement or action is to be executed by less than the total unit, the signaler will point, if necessary, toward the person(s) or element(s) of a unit as a warning that a signal will follow. However, when a movement or action is to be executed by the entire unit, the proper signal should be

preceded by the signal **ATTENTION**. Most signals may be given from the ground or from a vehicle. Unless otherwise indicated in the illustrations, the signaler will face the person(s) or element(s) for which the signal is intended.

5. Listed below are selected visual signals. You should know these standard arm-and-hand signals.

## SIGNALS TO CONTROL VEHICLES



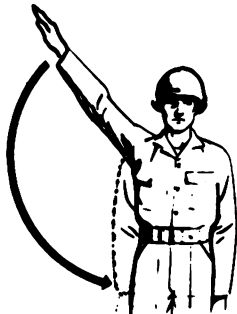
**START ENGINES or PREPARE TO MOVE.** Simulate cranking of engines by moving arm in a circular motion at waist level.



**STOP ENGINES.** Draw right hand, palm down, across the neck in a "throat cutting" motion from left to right.



**MOUNT.** With the hand extended downward at the side, with the palm 45° out, raise arm sideward and upward to an angle of 45° above the horizontal. Both arms may be used when giving this signal. Repeat until understood.



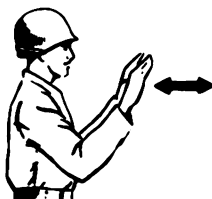
**DISMOUNT or TAKE A PRONE POSITION.** Extend arm sideward at an angle 45° above horizontal, palm down, and lower it to side. Both arms may be used in giving this signal. Repeat until understood.



**MOVE (the vehicle(s)) FORWARD or COME FORWARD.** Move hand(s) back-wards and forwards with palm(s) toward the chest as if pulling the vehicle.



**NEUTRAL STEER (tracked vehicles).** Cross wrists at throat; point index finger in direction steer is to be made. Clench fist of other hand.



**MOVE IN REVERSE (backup).** Face the unit (vehicle) being signaled; raise hands to shoulder, level palms to front. Move hands forward and back-wards as if pushing vehicle away.



**CHANGE DIRECTION.** Raise hands to shoulder level in front of the body. Form clenched fist on arm in direction turn is to be made. Make beckoning motion with other arm to bring vehicle forward. To reverse, make pushing motion.



**BUTTON UP or UNBUTTON.** To signal **BUTTON UP**, place both hands, one on top of the other, palms down on top of the helmet; with both arms back and in the same plane as the body. To signal **UNBUTTON**, give the **BUTTON UP** signal, then separate the hands, moving them slightly to each side in a slicing motion; repeat.



**CLOSE UP DISTANCE BETWEEN VEHICLES AND STOP.** Face the vehicle being signaled and extend forearms to the front, palms inward and separated by at least the width of the shoulders. Bring palms together as the distance shortens. The vehicle must stop when the palms come together.



**STOP.** (Alternate signal used to stop tracked vehicles.) Clasp the hands together, palms facing each other, at chin level.



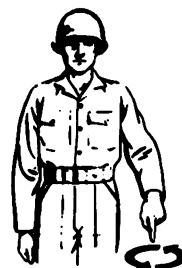
**RAISE RAMP.** (For use with vehicles with ramps.) Make circular motion with either hand at head level and the other arm extended across body.



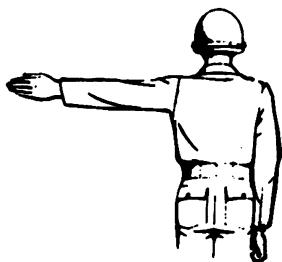
**LIGHTS OFF.** Index finger of right hand pointing towards eye and "thumbs down" signal with left hand.



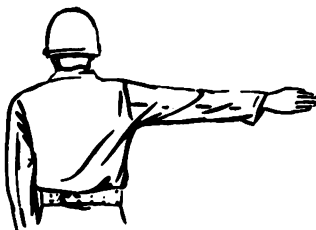
**LIGHTS ON.** Index finger of both hands pointing towards eyes.



**LOWER RAMP.** (For use with vehicles with ramps.) Make circular motion with either hand pointing to the ground.



**LEFT TURN or COLUMN LEFT.** Extend left arm horizontally to the side, palm to the front.



**RIGHT TURN or COLUMN RIGHT.** Extend right arm horizontally to the side, palm to the front.



**PASS AND KEEP GOING.** Extend left arm horizontally to the side, palm to the front, and describe large circles to the front by rotating arm clockwise from the elbow.

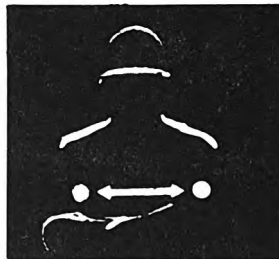


**ATTENTION.** Extend the arm sideways, slightly above horizontal; palm to the front; wave arm to and away from the head several times.

## USING A FLASHLIGHT TO CONTROL VEHICLES



**START ENGINES.** Move the light to describe a horizontal figure 8 in a vertical plane in front of the body.



**STOP or STOP ENGINES.** Move the light horizontally back and forth several times across the path of approaching traffic to stop vehicles. Use the same signal to stop engines.



**GO; FORWARD; MOVE OUT; INCREASE SPEED; or DOUBLE TIME.** Move the light vertically several times in front of the body.



**MOVE IN REVERSE** (for vehicles which are not moving) or **SLOW DOWN** (for vehicles which are moving). Hold the light at shoulder level and blink several times toward the vehicles.



**TURN LEFT (RIGHT).** Rotate light to describe a circle 12 to 18 inches in diameter in the desired direction of the turn



## REFERENCES:

FM 7-7, The Mechanized Infantry Platoon and Squad, Sep 77 (app D, page 3)

FM 21-60, Visual Signals, Dec 74 (chap 2, pages 2-15 thru 2-18)

## APPENDIX A

### CONSOLIDATED LIST OF REFERENCES

#### FIELD MANUAL (FM)

FM 3-87	NBC Reconnaissance and Decontamination	TBP
FM 5-15	Field Fortifications	Jun 72
FM 5-20	Camouflage	May 68
FM 5-25	Explosives and Demolitions	Feb 71
FM 5-34	Engineer Field Data	Sep 76
FM 7-7	The Mechanized Infantry Platoon and Squad	Sep 77
FM 17-12	Tank Gunnery	Mar 77
FM 20-22	Vehicle Recovery Operations	Jul 70
FM 20-32	Mine/Countermine Operations at the Company Level	Nov 76
FM 20-60	Battlefield Illumination	Jan 70
FM 21-6	How to Prepare and Conduct Military Training	Nov 75
FM 21-10	Field Hygiene and Sanitation	Jul 70
FM 21-11	First Aid for Soldiers	Jun 76
FM 21-20	Physical Readiness Training, C1-3	Mar 73
FM 21-26	Map Reading, C1	Jan 69
FM 21-40	NBC Defense	Oct 77
FM 21-41	Individual NBC Defense	Oct 77
FM 21-60	Visual Signals	Dec 74
FM 21-75	Combat Training of the Individual Soldier and Patrolling, C1	Jul 67
FM 21-305	Manual for the Wheeled Vehicle Driver	Apr 75
FM 22-5	Drill and Ceremonies, C1, 2	Nov 71
FM 22-6	Guard Duty, C1	Sep 71

<b>FM 22-100</b>	<b>Military Leadership</b>	<b>Jun 73</b>
<b>FM 23-9</b>	<b>M16A1 Rifle and Rifle Marksmanship, C1</b>	<b>Jun 74</b>
<b>FM 23-23</b>	<b>Antipersonnel Mine M18A1 and M18 (Claymore), C1, 2</b>	<b>Jan 66</b>
<b>FM 23-30</b>	<b>Grenades and Pyrotechnic Signals</b>	<b>Dec 69</b>
<b>FM 23-33</b>	<b>66-mm HEAT Rocket, M72A1, M72A1E1, and M72</b>	<b>Jul 70</b>
<b>FM 23-35</b>	<b>Pistols and Revolvers</b>	<b>Sep 71</b>
<b>FM 23-65</b>	<b>Browning Machinegun, Caliber .50 HB, M2, C1</b>	<b>May 72</b>
<b>FM 24-1</b>	<b>Combat Communications</b>	<b>Sep 76</b>
<b>FM 31-70</b>	<b>Basic Cold Weather Manual, C1</b>	<b>Apr 68</b>
<b>FM 71-1</b>	<b>The Tank and Mechanized Infantry Company Team</b>	<b>Jun 77</b>

### **TRAINING CIRCULAR (TC)**

<b>TC 6-40-4</b>	<b>Fire for Effect</b>	<b>Mar 77</b>
<b>TC 21-11</b>	<b>Pocket Medic-Emergency Aid Guide for Soldiers</b>	<b>Feb 77</b>
<b>TC 21-26</b>	<b>Don't Get Lost</b>	<b>Feb 73</b>
<b>TC 23-13</b>	<b>Crew-Served Weapon Night Vision Sight</b>	<b>Jan 67</b>
<b>TC 24-2</b>	<b>Communications-Electronics Operations Instructions; The Automated CEOI</b>	<b>Dec 75</b>
<b>TC 30-3</b>	<b>Soviet Equipment Recognition Guide</b>	<b>Apr 75</b>

### **TECHNICAL MANUAL (TM)**

<b>TM 3-4230-204-12&amp;P</b>	<b>Decontaminating Apparatus, Portable, DS2, 1½ Qt., ABC-M11</b>	<b>Feb 78</b>
<b>TM 3-4240-279-10</b>	<b>Operator's Manual: Mask, Chemical-Biological: Field ABC-M17/M17A1 and Accessories</b>	<b>Aug 75</b>

<b>TM 5-6350-249-12</b>	<b>Operator and Organizational Maintenance Manual: Alarm Set, Anti-Intrusion; Restricted Area, AN/GSQ-151</b>	<b>Dec 69</b>
<b>TM 9-1005-213-10</b>	<b>Operator's Manual: Machinegun, Cal .50 Browning, M2, C1, 2, and 3</b>	<b>Jul 68</b>
<b>TM 9-1005-249-10</b>	<b>Operator's Manual: M16A1 Rifle</b>	<b>Apr 77</b>
<b>TM 9-1330-200-12</b>	<b>Operator's and Organizational Maintenance Manual: Grenades, Hand and Direction</b>	<b>Sep 71</b>
<b>TM 9-1345-203-12&amp;p</b>	<b>Operator's and Organizational Maintenance Manual: Land Mines, C1</b>	
<b>TM 9-1425-470-12</b>	<b>Operator's and Organizational Maintenance Manual for TOW Heavy Antitank/Assault Weapon System, C1-5</b>	<b>Jan 74</b>
<b>TM 9-2300-257-10</b>	<b>Operator's Manual: Carrier, Personnel, Full Tracked, Armored, M113A1</b>	<b>Aug 78</b>
<b>TM 9-2320-218-10</b>	<b>Operator's Manual for Truck, Utility: 1/4-ton, 4x4, M151</b>	<b>Aug 78</b>
<b>TM 9-2320-242-10</b>	<b>Operator's Manual for Truck, Cargo: 1¼-ton, 6x6, M561</b>	<b>Mar 77</b>
<b>TM 9-2320-244-10</b>	<b>Operator's Manual for Truck, Cargo: 1¼-ton, 4x4, M715, C1</b>	<b>Aug 68</b>
<b>TM 9-2320-246-10</b>	<b>Operator's Manual: Truck, Platform, Utility, ½-Ton, 4x4, M274A2, M274A3, and M274A5, C1, 2</b>	<b>Apr 67</b>
<b>TM 9-2350-259-10</b>	<b>Operator's Manual: Combat Vehicle, Antitank, Improved TOW Vehicle M901</b>	
<b>TM 10-277</b>	<b>Protective Clothing Chemical Operations, C1-3</b>	<b>Jul 67</b>
<b>TM 11-5805-201-12</b>	<b>Operator and Organizational Maintenance Manual: Telephone Set, TA-312/PT, C1, 2</b>	<b>Jun 67</b>
<b>TM 11-5805-243-12</b>	<b>Operation and Organizational Maintenance Manual: Telephone Set, TA-1/PT, C3-6</b>	<b>Sep 59</b>
<b>TM 11-5820-498-12</b>	<b>Operator and Organizational Maintenance Manual: Radio Sets, AN/VRC-64 and AN/GRC-160</b>	<b>May 67</b>

<b>TM 11-5820-667-12</b>	<b>Operator and Organizational Maintenance Manual: Radio Set, AN/PRC-77, C1-6</b>	<b>Jun 67</b>
<b>TM 11-5850-228-13</b>	<b>Operator's Organizational, and DS Maintenance Manual: Night Vision Sight, Tripod Mounted AN/TVS, C1, 4-7</b>	<b>Apr 67</b>
<b>TM 11-6665-214-10</b>	<b>Operator's Manual: Radiacmeters IM-93/PD IM-93/UD, and IM-147/PD, C1-3</b>	<b>Nov 62</b>
<b>TM 21-300</b>	<b>Driver Selection and Training (Wheeled Vehicles), C1</b>	<b>Jul 67</b>
<b>TM 21-301</b>	<b>Driver Selection, Training, and Supervision; Tracked Vehicles</b>	<b>Jul 67</b>
<b>TM 21-306</b>	<b>Manual for the Tracked Combat Vehicle Driver, C1</b>	<b>Aug 64</b>
<b>TM 38-750</b>	<b>The Army Maintenance Management System (TAMMS), C1</b>	<b>May 78</b>

### **TECHNICAL BULLETIN**

<b>TB CML 100</b>	<b>Smoke Pot, HC, 10-lb, M1 and 30-lb, ABC-M5; Smoke Pot, Floating, HC, M4A2; SGF2, AN-M7 and SGF2, AN-M7A1, C2</b>
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### **LUBRICATION ORDER**

<b>LO 9-2300-257-12</b>	<b>Carrier, Personnel, Full Tracked, Armored: M113A1</b>	<b>Oct 73</b>
<b>LO 9-2320-244-12</b>	<b>Truck, Cargo: 1¼-ton, 4x4, M715</b>	<b>Aug 73</b>

### **ARMY REGULATION (AR)**

<b>AR 385-10</b>	<b>Army Safety Program</b>	
<b>AR 385-55</b>	<b>— Prevention of Motor Vehicle Accidents</b>	<b>Apr 74</b>
<b>AR 600-9</b>	<b>Army Physical Fitness and Weight Control Program</b>	<b>Nov 76</b>

### **DA PAMPHLETS**

<b>DA Pam 623-1</b>	<b>Preparation of Enlisted Evaluation Reports</b>
<b>DA Pam 750-31</b>	<b>The M561/M792 Gama Goat-Operation and Preventive Maintenance</b>

### **GRAPHIC TRAINING AIDS**

<b>GTA 21-1-3</b>	<b>M16 Rifle Maintenance Card</b>
<b>GTA 9-4-5</b>	<b>Mine, Antitank, M21</b>



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**TRAINING EXTENSION COURSES (TEC)**

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**COMBAT TECHNIQUES**

- 020-071-1042-F      React to Indirect Fire**  
**020-071-1049-F      Reacting to Flares**

**TARGET ACQUISITION**

- 020-171-1611-F      Target Range Determination**  
**020-171-1612-F      Locating and Reporting Targets**  
**020-171-1613-F      Use of Binocular Reticle and Worm Formula**  
**020-171-1614-F      Target Acquisition Scanning Techniques**

**COMMUNICATION**

- 201-113-4501-F      Preparation of Radio Set AN/PRC-77 for  
Operation: Pt 1, Install**  
**201-113-4502-F      Preparation of Radio Set AN/PRC-77 for  
Operation: Pt 2, OP, Checks**  
**201-113-4503-F      Preparation of Radio Set AN/PRC-77 for  
Operation: Pt 3, Pre-Sets**

**DEMOLITIONS**

- 645-093-7320-F      Prepare a Nonelectric Firing System**  
**645-093-7321-F      Prepare an Electric Firing System**  
**645-093-7322-F      Prepare Detonating Cord Firing System**

**FIRST AID**

- 911-441-0026-F      Basic First Aid Measures: Restoring the  
Breathing**  
**911-441-0027-F      Basic First Aid Measures: Restoring the  
Heartbeat**  
**911-441-0028-F      Basic First Aid Measures: Stopping the Bleeding,  
Pt 1**

### **FIRST AID CONTINUED**

911-441-0029-F	Stopping the Bleeding, Pt 2 and Controlling for Shock
911-441-0030-F	Fractures and Splinting
911-441-0031-F	Dressings and Bandages, Pt 1
911-441-0032-F	Dressings and Bandages, Pt 2
911-441-0033-F	Burns and Eye Injuries
911-441-0034-F	Snake Bites and Hot Weather Hazards
911-441-0035-F	Cold Weather Hazards

### **PERSONAL HYGIENE**

929-441-0040-F	Care of Feet
929-441-0043-F	Environment Hazards, Pt 1; Treatment of Drinking Water

### **LAND NAVIGATION**

930-071-0013-F	Introduction to Land Navigation
930-071-0014-F	Measuring Distances and Azimuths
930-071-0015-F	Converting Azimuths
930-071-0016-F	Terrain Features
930-071-0017-F	The Lensatic Compass
930-071-0018-F	Navigating with Map and Compass
930-071-0161-F	Orient a Map by Terrain Association
930-071-0162-F	Determine Direction Using a Field Expedient Method
930-071-0163-F	Determine a Location on the Ground
930-071-0165-F	Navigate From One Position On the Ground to Another Point

### **NUCLEAR, BIOLOGICAL, CHEMICAL**

931-061-0060-F	NBC: The Mask
931-061-0061-F	NBC: Masking and When To Do It
931-061-0062-F	NBC: First Aid, Pt 1
931-061-0063-F	NBC: First Aid, Pt 2
931-061-0064-F	Individual Protection and Decontamination

**ALL SOLDIERS PRINTED TEXTS**

**931-061-0065-A**                      **NBC: Maintenance of the M17 Series Mask**

**INTELLIGENCE & COUNTERINTELLIGENCE**

**935-071-1026-F**                      **Collecting and Recording Information**

**935-071-1028-F**                      **Processing Captured Personnel, Equipment, and Documents**

**935-071-1029-F**                      **Counterintelligence**

**COMMUNICATIONS**

**936-061-0108-F**                      **RTP: Part 1, Initiating and Responding to Radio Call**

**936-061-0109-F**                      **RTP: Part 2, Writing Down Messages Received by Radio**

**936-061-0110-F**                      **RTP: Part 3, Responding to Messages**

**936-061-0111-F**                      **RTP: Part 4, Preparing Messages to Be Sent**

**936-061-0112-F**                      **RTP: Part 5, Sending and Receiving Messages**

**936-061-0113-F**                      **RTP: Part 6, Entering and Leaving a Radio Net and Authenticating**

**936-061-0125-F**                      **Field Wire Installation: Equipment**

**936-061-0126-F**                      **Field Wire Installation: Ties**

**936-061-0128-F**                      **Field Wire Installation: Splicing**

**936-061-0129-F**                      **Field Wire Installation: Maintenance and Troubleshooting**

**936-061-0131-F**                      **Counterjamming Procedures**

**936-061-0140-F**                      **CEOI, Part 1: How to Use the CEOI**

**936-061-0141-F**                      **CEOI, Part 2: Message Authentication**

**936-061-0137-J**                      **Local Battery Operation for TA-312/PT**

## **COVER, CAMOUFLAGE, AND CONCEALMENT**

937-061-0030-F	Cover, Camouflage, and Concealment, Pt 1
937-061-0031-F	Cover, Camouflage, and Concealment, Pt 2
937-061-0032-F	Cover, Camouflage, and Concealment, Pt 3

## **RIFLES**

939-071-0009-F	Loading and Unloading the M16A1 Rifle
939-071-0010-F	Disassembly and Assembly of the M16A1 Rifle
939-071-0011-F	Maintaining the M16A1 Rifle
939-071-0012-F	Preventing and Correcting Common Malfunctions

## **GRENADE LAUNCHER, M203**

940-071-0089-F	Field Expedient Devices: M16 and M203
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## **MACHINEGUN CAL .50**

941-071-0115-F	The Cal .50 MG: Mounting
941-071-0116-F	The Cal .50 MG: Mechanical Training
941-071-0117-F	The Cal .50 MG: Headspace and Timing
941-071-0118-F	The Cal .50 MG: Field Zeroing
941-071-0119-F	The Cal .50 MG:Firing

## **MACHINEGUN TARGET ENGAGEMENT**

941-071-0125-F	Machinegun Target Engagement, Introduction
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## **HAND GRENADES**

942-071-0001-F	The Hand Grenade - Types and Uses
942-071-0002-F	Hand Grenade Maintenance and Identification
942-071-0003-F	The Hand Grenade: Carrying, Arming, and Throwing

**WHEELED VEHICLES**

944-441-0012-F	Gamma Goat Checks and Services, Pt 1
944-441-0013-F	Gamma Goat Checks and Services, Pt 2
944-441-0014-F	Gamma Goat Checks and Services, Pt 3
944-441-0015-F	Gamma Goat Checks and Services, Pt 4
944-441-0016-F	Gamma Goat Checks and Services, Pt 5
944-441-0017-F	Gamma Goat Checks and Services, Pt 6
944-441-0018-F	Gamma Goat Checks and Services, Pt 7
944-441-0019-F	Gamma Goat Five Wheel Operation
944-441-0020-F	Gamma Goat Operation Under Unusual Conditions

**MAINT M113A1/M577A1**

945-171-0051-F	Before-Operations Maint M113A1/M577A1, Pt 1
945-171-0052-F	Before-Operations Maint M113A1/M577A1, Pt 2
945-171-0053-F	During-Operations Maint M113A1/M577A1
945-171-0054-F	After-Operations Maint M113A1/M577A1

**TRACKED VEHICLES**

945-171-0100-F	Varied Terrain Driving
945-171-0101-F	Reduced Traction and Hazards

**MINES, CLAYMORE**

947-071-0106-F	Claymore Mines, Introduction, CKT Testing, and Emplacement
947-071-0107-F	Electrical Arming and Firing
947-071-0109-F	Disarming, Recovery, and Emergency Destruction Procedures
947-071-0110-F	Multiple Emplacement and Review
947-071-0118-F	Disarm an M16A1 Anti Personnel Mine
947-071-0184-F	Arming and Disarming the M-21 Anti Armor Mine

**LAW**

- |                |                           |
|----------------|---------------------------|
| 948-071-0005-F | Operating the LAW         |
| 948-071-0006-F | LAW (Engaging the Target) |

**TOW MISSILE**

- |                |   |
|----------------|---|
| 948-071-0020-F | Introduction to Antiarmor Weapons             |
| 948-071-0021-F | Prepare the TOW for Ground Operations, Part I |
| 948-071-0023-F | TOW Fire Commands                             |
| 948-071-0024-F | Loading, Tracking, and Firing the TOW         |
| 948-071-0025-F | The TOW/APC System                            |
| 948-071-0026-F | The TOW 1/4-Ton System                        |
| 948-071-0027-F | Maintenance of the TOW System                 |
| 948-071-0028-F | The M70 Training Set (TOW)                    |
| 948-071-0029-F | Preparation of TOW and Dragon Range Cards     |

**CALL FOR FIRE AND ADJUSTMENT**

- |                |   |
|----------------|---|
| 949-061-0001-F | Determination of Direction  |
| 949-061-0002-F | Target Location: Polar Plot and Grid Coordination Methods         |
| 949-061-0003-F | Locate a Target by Shift from a Known Point                       |
| 949-061-0005-F | Adjustment of Field Artillery Fire, Bracketing and Creeping, Pt 1 |
| 949-061-0006-F | Adjustment of Field Artillery Fire, Bracketing and Creeping, Pt 2 |

**EARLY WARNING DEVICES**

- |                |  |
|----------------|--|
| 952-061-0050-F | Expedient Early Warning Devices, Pt 1  |
| 952-061-0051-F | Expedient Early Warning Devices, Pt 2  |
| 952-061-0052-F | Trip Flares                            |
| 952-061-0054-F | Early Warning Devices: Electronic Pt 1 |
| 952-061-0055-F | Electronic Early Warning Devices       |

**NIGHT VISION DEVICES**

- |                |   |
|----------------|---|
| 953-071-0062-F | AN/TVS-2 Night Vision Sight for Crew-Served Weapons |
| 953-071-0063-F | AN/TVS-2 Engaging the Target                        |

**QUESTIONNAIRE**

**SOLDIER'S MANUAL**

To provide you a better manual, please give us your comments after studying this field manual. Note that some of the questions apply to soldiers only and some to trainers only. Please fill out the following before continuing. If you request an answer or wish a reply, please include your name.

**MOS** \_\_\_\_\_ **RANK** \_\_\_\_\_ **TIME IN GRADE** \_\_\_\_\_

**TIME IN SERVICE** \_\_\_\_\_ **UNIT** \_\_\_\_\_

**DIVISION** \_\_\_\_\_

**NAME (optional)** \_\_\_\_\_

1. The following comments are a result of my review of the 11H Soldier's Manual for Skill Level \_\_\_\_\_.

2. My duty position is: \_\_\_\_\_

3. The Soldier's Manual contains only the critical combat skills the infantryman needs to fight and survive on the battlefield. I think it contains:

☐ Too many tasks

☐ The right number

☐ Too few tasks

4. Are there tasks that should be added?

☐ Yes (See the list below)

☐ No

Continue in block 15 if needed.

**5. Are there tasks that should be dropped?**

- ☐ Yes (See the list below)      ☐ No

\_\_\_\_\_ **Continue in block 15 if needed.** \_\_\_\_\_

**6. How difficult was it to find the tasks which you must perform?**

- ☐ Easy, I had no trouble.
- ☐ Not difficult, but I think the instructions were confusing. (Please tell us how to improve the instructions in the space below).
- ☐ Difficult, I had to have someone explain how to do it.

\_\_\_\_\_ **Continue in block 15 if needed.** \_\_\_\_\_

**7. Will the Soldier's Manual help you do a better job as an infantryman?**

- ☐ No, I don't think it will help at all.
- ☐ Yes, it will be a big help.
- ☐ Yes, but it will be better if improvements are made. (List the improvements you would like to see.)

\_\_\_\_\_ **Continue in block 15 if needed.** \_\_\_\_\_



8. Did the conditions for each task describe the real conditions under which you usually perform each task?

☐ Yes

☐ No, I would change:

\_\_\_\_\_ Continue in block 15 if needed. \_\_\_\_\_

9. The STANDARDS are:

☐ Too easy

☐ Too hard

☐ About right

10. Can the PERFORMANCE MEASURES help you perform the task to the standard?

☐ Yes

☐ No

If you check NO please explain in block 15.

11. (Trainers only): Will the Soldier's Manual help you as a trainer in improving the combat proficiency of 11H soldiers?

☐ Yes, I think it will be a big help.

☐ Yes, but the Soldier's Manual needs to be changed as I recommended in question 10.

☐ No, it will not help at all (please explain in block 15).

12. Which of the following best tells what an infantryman must be able to do in combat?

☐ Job Description in AR 611-201, Personnel Selections and Classification.

☐ Study Guides for MOS Tests.

☐ Soldier's Manual.

☐ 11B Study Reference Manual.

☐ Other \_\_\_\_\_

Continue in block 15 if needed.

- 13. If I could make any improvement(s) in the Soldier's Manual it (they) would be:**

---

**Continue in block 15 if needed.**

---

- 14. Is the artwork used in this field manual understandable and correct for each task?**

☐ Yes

☐ No

If you checked no, please make suggestions concerning replacement of artwork in block 15 or enclose suggested line drawing, sketch, photo, etc., with this questionnaire.

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- 15. Comments.**

**Comments (cont).**

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**STAPLE**

**Questionnaire-6**

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**I CERTIFY THE ABOVE REQUEST IS VALID.**

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